Strategy 2021–2026

People. Systems. Culture.

Approved for Release by NAE Council

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About the National Academy of Engineering

Founded in 1964, the National Academy of Engineering is one of the three academies that make up the National Academies of Sciences, Engineering, and Medicine (the National Academies). Operating under the same congressional charter of the National Academy of Sciences, signed in 1863 by President Lincoln, the National Academies provide independent, objective analysis and advice to the nation and conduct other activities to enable approaches for complex problems and inform public policy decisions. The National Academies also encourage education and research; recognize outstanding contributions to knowledge and practice; and increase public appreciation of science, engineering, and medicine. Engineering-related activities cut across the program units of the National Academies.

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Motivation

In 2019 the National Academy of Engineering (NAE), under new leadership, took the opportunity to refresh and modernize its activities. With the subsequent global impacts of the 2020 coronavirus pandemic, the NAE began reflecting on its role both as an advisory organization functioning in a complex environment and as a premier ambassador for the engineering profession. With the aim of best positioning and expanding organizational insights and impact, the NAE initiated a strategic planning effort to guide its programming for a 5-year period, from October 1, 2021, to September 30, 2026.

The effort began with a survey of NAE membership to determine their priorities for the future. Respondents considered the NAE's responsibility of providing independent advice very important but did not believe that responsibility was well known or appreciated. They were generally excited about the programmatic offerings and suggested new topics to explore in the areas of health, climate change, sustainability, and the environment, as well as diversity, equity, and inclusion. They suggested robust interaction with industry and engineering professional societies but thought the federal government should remain a primary audience for NAE products.

Using the survey results to inform the conversation, over an 8-month period in 2020, a strategic planning committee, with the assistance of a facilitator, engaged with NAE members and staff as well as key engineering stakeholders. A summary of the resulting analysis is presented in this document.

Commitment and Values

The NAE affirms its commitment to provide engineering leadership and insights for a complex world by focusing on **people, systems and culture**—the guiding theme of this 5-year strategic plan. This commitment will be enabled by NAE priorities to:

- Identify and inform the frontiers of engineering theory, practice, and policy.
- Increase engineering talent through a strong commitment to diversity, equity, and inclusion.
- Instill a culture of ethical and environmental responsibility in engineering.
- Improve capabilities and competencies for complex systems engineering.

The core **values** that will reinforce the NAE's activities and its advisory responsibilities are

- **independence**,
- **integrity**, and
- **dedication to diversity, equity, and inclusion** to foster intergenerational collaboration for greater good and wellbeing.

Vision and Mission

In its service as trusted advisor to the nation, the NAE's **vision** is

> **to be the trusted source of engineering advice for creating a healthier, more secure, and more sustainable world.**

To achieve this vision, the NAE will proactively identify and address issues by engaging engineers and individuals from a variety of professional and community networks and with diverse backgrounds, perspectives, traits, and skills. Informed by these engagements, the NAE will promulgate the value of an engineering mindset for business, government, and daily life in support of its **mission:**

> **to advance the welfare and prosperity of the nation by providing independent advice on matters involving engineering and technology, and by promoting a vibrant engineering profession and public appreciation of engineering.**

Strategic Opportunities

The NAE has identified a number of strategic opportunities to pursue through implementation of this new strategic plan:

- Make the program activities cohesive and modern in service of the NAE's mission.
- Significantly improve the NAE's project development, planning, and execution practices.
- Generate more creative ideas, and marketable project and program proposals, in close collaboration with the NAE development office.
- Establish the leadership of NAE programs within the National Academies.
- Boost the visibility of NAE programs across the engineering and broader communities.

Activities, Goals, and Objectives

The NAE will fulfill its commitment and mission by integrating its values and stakeholder engagement across its feature activities: **presidential initiatives** (appendix A), **programs** (appendix B), **membership** (appendix C), **development** (appendix D), and **outreach and communications** (appendix E). Each of these areas will be guided by strategic goals and objectives (developed by council members and staff) and assessed with relevant performance metrics and measures.

Enablers and Evaluation

The NAE's principal strength is its ability to call on the pro bono services of its nearly 2500 peer-elected members and international members—senior professionals in business, academia, and government who are among the world's most accomplished engineers. The NAE uses its outstanding convening abilities to bring together its members and other experts to address issues of national and international concern, and to communicate findings and recommendations to policymakers, industry leaders, university faculty and administrators, and the public.

To achieve its strategic objectives, the NAE will capitalize on member involvement in its programs, development, and outreach and communications. In support of its ongoing programs redesign, campaign reorientation, and impact assessment, the NAE will engage members and other leaders to serve on advisory groups for its new program initiatives. Each program (described in appendix B) will be guided by a group appointed by NAE leadership to refine the

program's scope and to set performance metrics and goals, which will be regularly evaluated to ensure they are meeting organizational objectives. The NAE will also expand its member-led initiatives, and other forums and virtual discussions, to accommodate timely contributions. Specific metrics and measures, as well as progress against them, are captured in an expanded internal document.

The 2021–26 NAE strategy takes an adaptive approach to respond to critical and emerging issues, whether through its own programs or through collaborations across the program divisions of NASEM.

Appendix A: NAE Presidential Initiatives

The **Racial Justice and Equity Committee (RJE)** will advise the NAE president and council and recommend (i) ways to increase awareness of racial injustice and inequity among NAE members and the engineering community, (ii) initiatives to increase the percentage of engineering degrees in higher education obtained by African Americans and other persons of color, (iii) strategies to increase the number of underrepresented minorities in the highest leadership positions of the NAE, and (iv) ways that technology can be used to improve racial justice. The RJE committee will also develop strategies for fundraising to achieve these tasks.

The committee will focus its work in two areas. In the first, equity and sustainability, the RJE committee will engage in national efforts to increase African American, Hispanic, and Native American representation among engineering graduates and the engineering workforce. It will also examine changes to policy and process reflecting a long-term sustained commitment to racial justice and equity among key engineering stakeholders.

In the second area, engineering for justice and equity, the RJE committee will seek to (i) engineer the nation's infrastructure while protecting health, security, and economic opportunities for all citizens; (ii) promote technology and systems modeling to detect and reduce injustices against minorities; (iii) promote awareness of potential bias in machine-learned algorithms and merit criteria; and (iv) promote awareness of assistive engineering technologies and systems for people living with disabilities.

The **President's Business Advisory Committee (PBAC)** will provide advice and help in (i) engaging the business community in the activities of the National Academy of Engineering and (ii) elevating both the real and perceived value of the NAE to the business community.

The large business membership of the NAE makes it unique among the three National Academies. To ensure the NAE's effective engagement and representation of the business community, the sector must perceive the NAE as a valuable organization that not only honors its members but also serves the nation as well as the interests of industry and the engineering profession. The PBAC will work with the NAE president to strengthen the academy's business engagement and representation in its membership, in its guidance to the government and the public, and in meetings with business leaders. Its goals include increasing (i) the value of the NAE to industry, (ii) awareness of the NAE among US and international businesses, (iii) the number of business nominations for NAE membership, (iv) the number of business volunteers on NAE and NASEM committees, and (v) financial support for NAE programs.

The PBAC's work will center around two overarching goals. The first—to increase the visibility of and respect for the NAE in the business sector—aims to:

- Encourage and support increased numbers of member nominations from the business sector.
- Encourage and support increased participation of members from the business sector in NAE and NASEM activities.
- Develop a joint program with the Business Roundtable in an area of common interest.
- Engage senior company leadership, including those who are not NAE members, in identifying potential NAE candidates for election.

The second overarching goal—to increase the relevance of the NAE to the business sector—aims to:

- Develop NAE and NASEM activities and programs that industry values.
- Involve R&D and engineering leaders in visioning and planning for both the NAE and the National Academies.
- Effectively communicate with CEOs, CTOs, and chief engineers about NAE activities relevant to industry sectors and the value proposition of NAE membership.

Appendix B: NAE Programs

NAE Programs will seek to achieve interlinked objectives in the areas of people, systems, and culture.

People Objectives

- Expand engineering awareness and literacy in the public, beginning in K-12 education, so that students from all backgrounds can learn about engineering careers, develop engineering habits of mind, and understand the critical role of engineering and related innovation in society.
- Foster workforce capabilities, competencies, and character in both educational and professional environments to enable rewarding careers as well as lifelong learning in engineering.
- Address organizational, economic, and policy issues that differentially affect students, engineers, and related professionals based on their background and personal characteristics.
- Examine motivations and incentives in engineering that affect both individual decisions and the overall professional practice.
- Cultivate a more welcoming profession for a variety of aspirants and participants.

Systems Objectives

- Engage industry and other groups to envision engineering practice that transcends technology and to guide the adaptation and application of complex systems engineering concepts across different contexts.
- Conduct international activities to promote awareness and use of complex systems thinking in partnership with international academies of engineering and other relevant networks.
- Organize forums and workshops to help synthesize proficiencies and philosophies from different intellectual traditions and practice areas in and beyond engineering.

Culture Objectives

- Inspire an engineering identity and responsibility beyond individual work and purely technical interests.
- Expand understanding of how cultural, ethical, and social circumstances and the environment affect and are affected by the practice of engineering.
- Seamlessly integrate cultural, ethical, social, and environmental responsibility considerations into the practice and scholarship of engineering; and promote an understanding of the global effects of engineering innovation and its outcomes.

These objectives will be achieved through the following new and reformulated programs:

The program on **Practices for Engineering Education and Research (PEER)** will conduct studies, workshops, and other activities focused on engineering education writ large and related research at the precollege and higher education levels. PEER will consider the entire educational system, contextual influences on that system, and how elements of the system affect each other. Its activities will bring together researchers and practitioners in engineering

education and publish analyses to guide change. Its primary audiences are preK-12 educators; higher education faculty, instructors, staff, and administrators; business leadership; and professional societies. Sponsorship opportunities include the National Science Foundation, private foundations, philanthropy, and professional societies.

The program on **Cultural, Ethical, Social, and Environmental Responsibility in Engineering (CESER)** seeks to (i) expand understanding of how cultural, ethical, and social circumstances and the natural environment affect and are affected by the practice of engineering; (ii) raise awareness of how engineering design, innovation, and the engineering mindset can responsibly contribute to addressing society's greatest challenges; and (iii) produce publications resulting from its studies and workshops. Its primary audiences are practicing engineers, educators, professional societies, government, and the general public. Sponsorship opportunities include federal agencies (NSF, EPA, etc.), private foundations, philanthropy, and ESG (environment, society, and governance) investors.

The program on **Inclusive, Diverse, and Equitable Engineering for All (IDEEA)** will inform, inspire, and provide opportunities for marginalized youth (with particular focus on K-12) and marginalized groups (e.g., those of underrepresented races, ethnicities, genders, and living with disabilities), and encourage them to consider the rewards of an engineering degree and career. New activities under development for IDEEA aim to support equitable, inclusive, and just involvement in engineering by building on the success of and expanding beyond EngineerGirl—an internationally recognized, signature outreach activity of the NAE. Its primary audiences are K-12 youth, particularly those from marginalized groups, parents and families, and educators and communities. Sponsorship opportunities include corporations, private foundations, and philanthropy.

The **Forum on Complex Unifiable Systems (FOCUS)** is a new, multistakeholder initiative to advance understanding of complex technical and social systems and identify unifiable approaches to better manage them. It broadly focuses on systems engineering as the connecting theme (in health, economy, security, civics, education, infrastructure) and its importance in engineering innovation, maintenance, leadership, and policy. Its offerings will include international forums on popular interest themes as well as short-form perspectives with ideas, insights, and topical commentaries to guide executive decision making. Its primary audiences are the C-suite in business, government, nonprofits, NGOs, and academia. Primary sponsorship opportunities include industry and philanthropy.

The **Frontiers of Engineering (FOE)** symposia bring together emerging engineering leaders from industry, academia, and government labs to discuss leading-edge research and development. The US FOE symposium is held each year, along with a rotating schedule of bilateral meetings with Germany, Japan, China, and the European Union. New international engagements are being planned for the series.

NAE periodicals include (i) *The Bridge*, which publishes articles on engineering research, education, policy, practice, and culture—the quarterly aims to inform and stimulate debate and dialogue among NAE members as well as policymakers, educators, business leaders, and

interested readers all over the world; and (ii) *NAE Perspectives*, a new short-form commentary series for practitioners, scholars, and policy leaders on developments and issues relating to engineering, accessible to a wide range of audiences.

Collaborative activities are studies and workshops in which the NAE engages with the NASEM program divisions—Behavioral and Social Sciences and Education, Earth and Life Studies, Engineering and Physical Sciences, Gulf Research, Health and Medicine, Policy and Global Affairs, and Transportation Research—as well as the National Academy of Medicine. Internationally, the NAE is advancing partnerships with the UK Royal Academy of Engineering and Chinese Academy of Engineering, and it continues to engage with the International Council of Academies of Engineering and Technological Sciences (CAETS).

Appendix C: NAE Membership

NAE's Membership has defined three strategic goals, each with supporting objectives and metrics:

- Elect and engage a more diverse domestic membership, with an emphasis on women, African Americans, Hispanics, and/or Native Americans, and candidates with a business background.
- Nominate and elect a more diverse international membership with an emphasis on nonacademic candidates.
- Increase the percentage of NAE members who participate in NAE and NASEM committees, and provide more meaningful opportunities for intellectual engagement.

Appendix D: NAE Development

NAE Development, which seeks to empower the NAE and its programs to achieve their mission by building a culture of philanthropy, has defined three strategic goals, each with supporting objectives:

- Align campaign activity to support current strategic priorities and enhance the NAE's convening power
    - Support and promote NAE programs and fundraising activities
    - Support presidential initiatives such as RJE activities and special lectures
- Grow the NAE endowment and future support
    - Secure unrestricted and strategic endowment support
    - Explore opportunities to endow NAE officer and staff positions
    - Secure a greater number of planned gifts
- Grow engagement with the NAE prospect pipeline
    - Grow new sources of donors
    - Communicate the impact of philanthropy by highlighting donor stories, gift impacts, recognition societies, events, etc.
    - Engage new donors and members in philanthropy
    - Secure increased support from corporations and corporate foundations

Appendix E: NAE Outreach and Communications

The NAE has defined six strategic goals, each with supporting strategies and tactics, to expand the outreach and communications function:

- Establish and sustain an Office of Outreach and Communications
    - Establish the NAE Office of Outreach and Communications, reporting to the NAE Executive Office and including the hiring of a director and assignment of program staff who perform outreach and communications to the new office
    - Leverage endowment, program, and charitable funds for sustainable support
- Build the NAE's public presence and public understanding of engineering
    - Implement the NAE's strategic outreach and communications plan, emphasizing content strategy, digital activities, social media reach and engagement, diversity and inclusion initiatives, awards, and key events; define and prioritize audiences; employ a mix of print and digital communication to members, and digital communications to others
    - Work to raise public understanding of engineering through media outreach, a public service campaign, NASEM Science-Entertainment Exchange events, and NAS Cultural Programs; establish financial and in-kind support from a range of partners (e.g., professional societies, industry, academia, cultural institutions); measure impacts of these individual approaches via focus groups and national surveys
    - Transition the public-facing NAE website to the NASEM unified web platform
    - Explore new, communications-focused partnerships with media and other organizations
- Enhance and coordinate NAE Program communications
    - Launch and promote new programs across international audiences
    - Amplify the communications impact of all programs; develop a targeted, evolving communications strategy for new programs; work with program officers to evolve communications strategies for existing programs
    - Transition the NAE Awards program to the new Outreach and Communications office
    - Integrate communications and outreach as a standard element in program and development proposals
- Boost the reach and impact of NAE publications
    - Develop a communications strategy to promote *Perspectives,* in partnership with NASEM
    - Refresh the look and content of *The Bridge*, emphasize its digital format, expand audience growth, content repurposing, and explore different article formats
    - Redesign the annual report for broad reach, improve look and readability, reduce cost
- Drive communications to engage industry
    - Define value proposition for industry and develop and amplify the value of the NAE and engineering
- Systematize collaboration with NASEM communications
    - Develop processes for collaboration and workflow with NASEM Office of Communications