

NSF Regional Innovation Engines (NSF Engines)

Frequently Asked Questions (FAQ)
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Process

1. How many concept outlines will be approved by NSF?

The NSF Engines program is not placing a limit on the number of concept outlines that will be approved.

2. What is the selection criteria for concept outlines?

concept outlines will be reviewed by NSF program staff to determine whether the topic area and proposed region of service meet the goals of the NSF Engines program (see Section V.A.1 of the Broad Agency Announcement [BAA] describing concept outline contents) and whether the review criteria in Section VI.B.1 of the BAA are adequately addressed.

3. Why should my team apply for a Type-1 award instead of a Type-2 award, which provides more funding?

Teams should select the proposal type that corresponds to the maturity level of the region's innovation ecosystem in the proposed topic area. For more assistance on choosing the appropriate proposal type, see Section II.F, Section III, and Appendix A of the BAA for information on the maturity characteristics of the phases of an innovation ecosystem as well as the purpose and expectations for different award types.

Type-1 awards are intended to help teams develop the networks, infrastructure, and resources necessary to create strong Type-2 proposals. Type-1 awards provide capacity-building support, technical assistance/training, and a cohort of regional peers who are at similar stages of ecosystem development. Teams representing more advanced innovation ecosystems should apply directly for Type-2 proposals. A Type-2 award is considered a Regional Innovation Engine (Engine), while a Type-1 award is considered a precursor to an eventual Engine.

4. Does getting a Type-1 award automatically give a team an advantage to receive a subsequent Type-2 award?

Type-1 awards are intended to help teams develop the networks, infrastructure, and resources necessary to create strong Type-2 proposals. All Type-2 proposals will be evaluated according to the criteria outlined in the NSF Engines BAA, irrespective of whether the team was previously awarded a Type-1 award. Teams representing more advanced innovation ecosystems should apply directly for Type-2 proposals.

5. In subsequent rounds, will a Type-1 award be a prerequisite for submitting a Type-2 proposal?

No, a Type-1 award will not be a prerequisite for a Type-2 proposal.

6. How many rounds of the NSF Engines BAA are anticipated?

In addition to this current funding opportunity, NSF anticipates a competition for additional Type-2 proposals in the Fiscal Year (FY) 2024-FY 2025 timeframe, subject to the availability of funds.

7. When can a Type-1 awardee submit a Type-2 proposal?

A team can submit a Type-2 proposal to an open funding opportunity in the NSF Engines program as soon as the team feels ready and no later than the deadlines specified in the BAA.

8. Given that a Type-1 award lasts up to two years and is geared to help the team prepare a strong Type-2 proposal, will there be a future funding opportunity for Type-2 NSF Engines beyond what is outlined in the BAA?

Yes. Subject to the availability of funds, NSF intends to announce another funding opportunity in the FY 2024-FY 2025 timeframe for Type-2 proposals.

9. Will there be any review feedback on submitted concept outlines?

Feedback will be provided for concept outlines that are declined.

10. concept outlines must be approved by NSF to submit a Full Proposal. What is the expected timing for the notification of NSF approving the concept outline? Will this occur before the Letters of Intent are due on August 31, 2022?

The notification process for the approval of concept outlines is expected to be completed prior to the Proposers' Day scheduled for August 1, 2022, subject to the number of concept outlines received.

11. Will all submitted concept outlines be published or only the ones that were selected to move forward?

NSF will publish a summary of only the concept outlines that are approved. This information will be available on the NSF Engines program website.

12. Will the entire concept outline be published or just the title/ topic and investigator list?

Section V.A.1 of the BAA lists the information that will be published from the approved concept outlines.

Proposals

1. Who can apply?

Proposals may be submitted by:

- U.S.-based non-profit, non-academic organizations;
- U.S.-based for-profit organizations; and
- Institutions of Higher Education (IHEs) accredited in and having a campus located in the US (please note that International Branch Campuses of US IHEs are not eligible to submit proposals under the NSF Engines BAA).

The BAA provides a list of other entities that can receive sub-awards. See Question #7 under Partnerships below. The [NSF Proposal and Award Policies and Procedures Guide \(PAPPG\)](#), Chapter I.E provides definitions of these types of organizations. When in doubt, please contact NSF Engines staff at engines@nsf.gov.

2. If my region has a strong innovation ecosystem in one topic area, can we still apply for an NSF Engine in another topic area?

Yes. However, the NSF Engines program will prioritize funding for regions across the Nation without well-established innovation ecosystems.

3. Can my region submit multiple proposals?

Yes. An organization may only submit one proposal in which it serves as the "lead organization," but may participate in multiple proposals. However, where appropriate, NSF strongly encourages organizations that intend to submit proposals serving a particular region to collaborate on a proposal rather than submit multiple proposals focused on similar topic areas. A given region is encouraged to identify its strengths and emerging competitiveness and develop a cohesive proposal for submission.

4. If multiple teams from my region apply, will that impact my team's likelihood of being selected?

NSF seeks to harness the geography of innovation that exists across the Nation, and therefore seeks to diversify the portfolio of Type-2 awards geographically. That said, since Type-1 awards are intended to develop regional capacity in preparation for Type-2 awards, it is possible that more than one Type-1 award could be made in a single region.

5. Can for-profit organizations such as startup accelerators, incubators, and venture capital firms submit proposals to the NSF Engines program?

All U.S.-based for-profit organizations are eligible to submit proposals to the NSF Engines program.

6. Does an applicant need to be registered in SAM.gov before the concept paper deadline?

SAM registration is not required to submit a concept outline. SAM registration is required to submit a letter of intent (LOI) and full proposal. However, registration of a new entity in SAM.gov can take many weeks.

7. How does the Engines program apply to US territories? For example, Puerto Rico.

Organizations in US territories may participate in and lead Engines proposals. The geographical region of service for an Engines proposal may include US territories.

8. Could an NSF Hub or Hub-equivalent consortium apply for an engine and elevate their activities to include industry and government partners?

Existing NSF funding does not preclude submitting an Engines proposal.

9. Can an umbrella organization overseeing IHEs, i.e., a university system, be a lead organization?

Yes, an umbrella organization may be the lead organization on an Engines proposal.

10. Our state has a central EPSCoR Office that coordinates activities. Is this entity eligible to submit the proposal?

All state agencies, offices (including EPSCoR offices) or divisions that are specifically dedicated to innovation, economic, and/or workforce development are eligible to receive NSF funds through subawards. They are not eligible to submit or lead Engines proposals.

11. The BAA provides page limits for the type-1 and type-2 concept outlines, but the ProSPCT system used to submit concept outlines only provides a text box. How will we know we are within our page limits?

The text box employs a character count limit for the concept outline narratives for each of the types that accommodates a generously text-dense 2 or 5 pages. Effectively, if a team has drafted material (text and graphics) of the appropriate length in Word or similar writing software, it should fit in the box without issue. HTML tags for text formatting are excluded from the character count but please call the listed help desk number from the bottom of the ProSPCT page if you are experiencing something different from the form. A validation runs whenever a user saves a draft and will alert you to any length issues before completing the submission. As long as no error pops up, your submission has met the completeness requirements for a concept outline submission.

12. How important is research for a proposed Engine?

Use-inspired research and translation of research to practice are two of the three pillars for any NSF Engine (the third is workforce development). A successful Engines proposal must necessarily include clearly defined research objectives aimed at addressing a significant challenge of national and societal importance.

Submission Limits

1. Is there a limit on the number of concept outlines a lead organization can submit?

No. There is no limit on the number of concept outlines an organization may submit, as a lead or a partner organization. The concept outline is not considered to be a proposal, so the proposal limits specified in the BAA do not apply to concept outlines.

Proposers must recognize the mission of the NSF Engines Program goes well beyond establishing large-scale research centers (e.g., NSF Engineering Research Centers or Science and Technology Centers). NSF strongly encourages proposers applying to serve as the lead organization to consider that any funded Engine will be charged with catalyzing an innovation ecosystem for its defined region

of service. Given the scale and scope of an Engine, NSF strongly recommends that organizations looking to lead an Engine promptly begin to evaluate regional needs and strengths, including but not limited to, determining the topic area(s) of focus, identifying prospective industry and community partners, and developing use-inspired research themes. It should be noted that a topic area may warrant the inclusion of several research themes, which can be covered under one concept outline.

2. Is there a limit on the number of LOIs that can be submitted by a lead organization?

Yes. As stated in Section V.A.2 of the BAA, “An organization may submit only one LOI as the lead organization.” While we acknowledge there has been inconsistent messaging from the NSF Engines team with respect to this question, we have stressed from the beginning that the BAA is the governing document for the NSF Engines program and takes precedence.

As a reminder, a LOI is simply a notification to NSF that the organization intends to submit a full proposal. All proposals submitted will be associated with an LOI. NSF will check for compliance with proposal submission limits only after proposals have been submitted. If it is found that an organization has submitted proposals, then NSF will only accept the earliest submitted proposal from the organization and return other proposals without review.

3. Can an organization submit one Type-1 proposal and one Type-2 proposal in response to the current funding announcement?

No. An organization serving in the lead role may submit no more than one proposal in response to the current funding announcement. Prospective proposers should evaluate the maturity level of their region's current innovation ecosystem, as described in Appendix A of the BAA. Type-1 proposals should be submitted by proposers who can demonstrably claim that their region of service is at the maturity level corresponding to the Development Phase. Type-2 proposals should be submitted by proposers who can demonstrably claim that their proposed Engine's region of service is at a maturity level corresponding to either the Nascent or Emergent Phase.

NSF anticipates future competitions for Type-2 Engine awards beyond the current BAA, subject to the availability of funds.

4. Is there a limit on the number of proposals on which an organization can be listed as a non-lead core partner or subawardee?

No, there is no limit. However, the organization must be able to demonstrate that it has the capacity and resources to contribute to all Engines for which it is listed as a core partner.

5. If an organization submits multiple concept outlines as lead, does NSF intend to approve only one from that lead? Or could they approve more than one and then the lead will need to determine which they move forward with to the LOI/full proposal?

NSF does not restrict the number of concept outlines an organization may submit and the approval process will not consider the existence of other submissions by an organization.

6. If my organization submits a Type-2 concept outline by June 30, could we subsequently submit a Type-1 proposal if we determine that our region and topic area are not ready to pursue a full-scale Engine, but would benefit from a Type-1 development proposal?

Yes. An organization that submits a Type-2 concept outline in response to the current Engines BAA, may submit a Type-1 or Type-2 proposal, if the original Type-2 concept outline was approved by NSF. An organization that submits a Type-1 concept outline can only submit a Type-1 proposal.

Regions of Service

1. How do you define a geographical region of service?

The region covered by the proposed NSF Engine should be defined by the applicant and can include a geographic footprint that spans multiple jurisdictions, and even crosses two or more states.

Regions of service should be sized to appropriately deploy and leverage NSF investment. It is important to demonstrate the potential impact that an award would have on the regional innovation economy and that the size or population of the region is appropriate for the proposed award. Proposers should clearly define the scope of the region of service and demonstrate that it makes sense in terms of building a regional innovation economy.

2. How do we determine if our region is eligible to submit a proposal?

Any region of the country is eligible to submit a proposal. The NSF Engines program will prioritize regions without well-established innovation ecosystems.

3. Does a region have to be contiguous?

Not necessarily, though a proposer should provide a compelling justification for a non-contiguous region of service.

4. How do we know what counts as a region with an under-developed innovation ecosystem, and if we are qualified for this?

The BAA provides guidance in Appendix A to help understand the stages of ecosystem development.

5. Can an engine be a rural community that partners with high tech areas, universities, or other organizations?

Yes, a rural community can partner with organizations in high tech areas to build an Engine. The proposal for such an Engine should demonstrate that the economic benefits of the engines will inure to the region of service.

6. Can your region include a cross border collaboration if your region includes a close connection to another country?

Yes, an Engine may have international partners subject to approval by NSF, post-award. These partners may not receive NSF funds and should not be included as part of the original proposal.

7. Does the region need to be contiguous, or can it be composed of similar areas across the country that would contribute to, benefit from, and grow its ecosystem from the Engine's focused activity?

The goal of the Engines program is to create regional-focused innovation economies. While an Engine may have partners outside of a defined region, they should be in service of the goal of building a regional innovation economy. The economic benefits of an Engine should inure to the region of service. NSF will want to understand how you determined your region of service if it includes non-contiguous geographies.

Partnerships

1. My organization is not an R1 academic institution ([Carnegie Classification](#)). Can we be a competitive lead organization in the NSF Engines program?

There is no requirement that a regional team will be led by an R1 institution of higher education. The NSF Engines program welcomes and encourages proposals from organizations that have not historically engaged as lead organizations for NSF funding opportunities. While institutions of higher education are invited and encouraged to apply as leads, the NSF Engines program hopes to see a broader swath of organizations (including for-profit and non-profit organizations) applying as leads, as well as potentially new models and entities created specifically for the purpose of the NSF Engines program. An NSF Engine could be led by a Minority-Serving Institution (MSI), non-profit organization, economic development agency, for-profit, tribal nation, or even a new innovative organizational structure that partners with regional academic institutions for the research component of the NSF Engine.

2. Who within an institution of higher education serve as Senior Personnel on an NSF Engines proposal?

Similar to other NSF programs, within an institution of higher education, tenure-track and research faculty can serve as senior personnel. Additionally, administrative staff in leadership roles at a university can serve as NSF Engine senior personnel if their and their office's work is central to an Engine's mission. Potential examples of non-traditional senior personnel include executives in the tech transfer, community and economic development, and provost offices, as well as university leadership teams at affiliated entrepreneurship centers, incubators, and accelerators.

3. What does it mean to be a core partner?

A core partner is an entity that contributes and/or receives significant resources as part of the NSF Engine's activities. Core partners participate in the NSF Engine through a formalized partnership agreement, provide resources to support the NSF Engine's activities, and have employees actively engaged in the NSF Engine's activities. Core partners may also receive funds through subawards from the lead organization. Additional responsibilities of core partners are described in section II.C.2. of the BAA.

4. Can an entity be a core partner on multiple proposals?

Yes, but if an organization is a core partner on multiple successful proposals, it must be prepared to explain in writing how it will be able to sustain multi-year engagement and/or financial support across multiple projects.

5. Can an entity outside an NSF Engine's region of service engage with the Engine as a core partner?

Yes, as long as all the activities of this entity are relevant to the goals of the NSF Engine and clearly benefit the Engine's region of service.

6. Can an NSF Engine receive funds from entities that are not core partners?

An NSF Engine may receive funds from other U.S. entities. As described in Section IV.A.2.3 of the BAA, any collaboration with an international organization should be discussed with NSF and requires NSF guidance, post-award.

7. What types of organizations may receive subawards?

- U.S.-based non-profit, non-academic organizations;
- U.S.-based for-profit organizations;
- Federally Funded Research and Development Centers;
- National laboratories;
- State, Local and Tribal governments, limited to agencies, offices, or divisions specifically dedicated to innovation, economic and/or workforce development; and
- IHEs accredited in, and having a campus located in the US (please note that International Branch Campuses of US IHEs are not eligible to receive funding through subawards under the NSF Engines BAA).

Any questions regarding eligibility of organizations should be directed to engines@nsf.gov.

8. Is there a limit to the size of my team?

No, there is no size limit. The size and membership of your team should be appropriate for the proposed NSF Engine goals.

9. Can we have a team with an international component?

International partners are not permitted as part of a proposal submitted to NSF pursuant to the NSF Engines BAA. However, after an award has been made, an international partner/collaborator may be added in accordance with the procedures established in Section VII.A.2.3 of the BAA.

10. Can international organizations be partners on NSF Engine proposals or receive subawards?

No. International partners are not permitted as part of a proposal submitted to NSF pursuant to the NSF Engines BAA nor may they be proposed as subawardees in a proposal.

11. Can we add new partners after an award?

Yes. It is expected that the set of partners will evolve over the lifetime of an NSF Engine award.

12. Can a non-profit be the lead organization and have partners in the private sector?

An NSF Engine can be led by a non-profit organization. Partner organizations may include private sector partners. Given the scope of work for a NSF Engine, NSF strongly recommends that teams include industry, government, academic, and non-profit stakeholders.

13. Can an NSF Engine receive funds from local or national entities that may or may not have an existing footprint in the region of service?

An NSF Engine may receive funds from domestic entities irrespective of their footprint in the region of service.

14. Can state governments, local governments and/or tribal nations be core partners on NSF Engine proposals? Can they receive subawards?

Yes, an NSF Engine may include state/local government agencies and offices as well as tribal-nation entities as core partners receiving subawards, as long as these entities are specifically dedicated to innovation, economic growth, and/or workforce development within the region.

15. Will proposals with for-profit entities as lead organizations be reviewed differently than ones with non-profit entities as leads?

The NSF Engines program will hold all lead organizations to the same standard. The lead organization and associated management structure need to demonstrate the leadership ability and capacity to meet the goals of the Engine.

16. Does an NSF Engine have to include all the following as partners – academic institutions, for-profits, non-profit, and state/local/tribal governments?

There is no requirement that an NSF Engine have all the listed types of organizations as partners. Proposers should meaningfully engage partners that span multiple sectors represented by the stakeholders in the region of service to achieve the multi-faceted objectives of the NSF Engines program.

17. The BAA describes a culture of diversity, equality, inclusion, and accessibility. How should this be reflected in the choice of NSF Engine partners?

The NSF Engines program seeks to expand the breadth of institution types that take on leadership roles including Minority-Serving Institutions (MSI), institutions in Established Program to Stimulate Competitive Research (EPSCoR) jurisdictions, and other organizations not traditionally supported by NSF. An Engine's partners should reflect the diversity of the Engine's region of service, with efforts made to involve, engage, and be inclusive of communities traditionally underrepresented or underserved in science, technology, engineering, and mathematics (STEM) broadly. This level of diversity and inclusion should also be reflected in the leadership team and organizations serving as core partners, along with the nature of the roles and commitments of all partners.

18. Can organizations that have not previously submitted to NSF serve as lead organizations?

Yes. An organization can serve as lead organization even if it has not previously submitted to NSF. In that case, if recommended for funding, there are additional steps that the organization must take before an award can be made. As such, we strongly encourage potential proposers to understand the requirements well in advance of the submission deadline. Please see the NSF guidance for prospective new awardees at <https://www.nsf.gov/pubs/2020/nsf20032/nsf20032.pdf>.

19. Can an Engine leverage existing NSF investments such as Centers?

An Engine may leverage existing NSF investments as partners or collaborators to strengthen the Engine's mission. Having a Center does not necessarily make a team more competitive. A proposing team from an existing Center will be expected to explain how the Center will be effectively leveraged to benefit the proposed engine.

20. May U.S.-based for-profit organizations participate in proposals responsive to the NSF Engines BAA?

Yes. However, U.S. subsidiaries of foreign companies or primarily foreign-owned U.S. companies for which the foreign company and/or foreign ownership corresponds to a "foreign entity of concern" as defined in sections 10612(a)(2) and 10638(3) of the CHIPS and Science Act of 2022 ([Public Law 117-167](#), Division B) are not eligible. This includes, among others, entities owned by, controlled by, or subject to the jurisdiction or direction of the government of the Democratic People's Republic of North Korea, the People's Republic of China, the Russian Federation, or the Islamic Republic of Iran.

21. What is a "foreign entity of concern"?

Sections 10612(a)(2) and 10638(3) of the CHIPS and Science Act of 2022 ([Public Law 117-167](#), Division B) define a "foreign entity of concern" as:

"a foreign entity that is—

(A) designated as a foreign terrorist organization by the Secretary of State under section 219(a) of the Immigration and Nationality Act ([8 U.S.C. 1189](#)(a));

(B) included on the list of specially designated nationals and blocked persons maintained by the Office of Foreign Assets Control of the Department of the Treasury (commonly known as the [SDN list](#));

(C) owned by, controlled by, or subject to the jurisdiction or direction of a government of a foreign country that is a covered nation (as such term is defined in section [4872 of title 10](#), United States Code);

(D) alleged by the Attorney General to have been involved in activities for which a conviction was obtained under—

(i) [chapter 37 of title 18](#), United States Code (commonly known as the Espionage Act);

(ii) section [951](#) or [1030](#) of title 18, United States Code;

(iii) [chapter 90 of title 18](#), United States Code (commonly known as the Economic Espionage Act of 1996);

(iv) the Arms Export Control Act ([22 U.S.C. 2751 et seq.](#));

(v) section 224, 225, 226, 227, or 236 of the Atomic Energy Act of 1954 (42 U.S.C. [2274](#), [2275](#), [2276](#), [2277](#), and [2284](#));

(vi) the Export Control Reform Act of 2018 ([50 U.S.C. 4801 et seq.](#)); or

(vii) the International Emergency Economic Powers Act ([50 U.S.C. 1701 et seq.](#)); or

(E) determined by the Secretary of Commerce, in consultation with the Secretary of Defense and the Director of National Intelligence, to be engaged in unauthorized conduct that is detrimental to the national security or foreign policy of the United States.

22. The BAA states that National Laboratories and Federally Funded Research and Development Centers may receive subawards; how are these defined?

- The 17 National Laboratories are listed in [42 USC 15801](#) ([https://us-code.house.gov/view.xhtml?req=\(title:42%20section:15801%20edition:prelim\)](https://us-code.house.gov/view.xhtml?req=(title:42%20section:15801%20edition:prelim)));
- Master Government List of Federally Funded R&D Centers ([FFRDCs](#)) (<https://www.nsf.gov/statistics/ffrdclist/>)

Topic Selection

1. What is an appropriate topic area?

The NSF Engines BAA includes guidelines in Section II.B.1 on selecting a topic area. Teams should consider the underlying goals of the NSF Engines program when selecting their topic area. For example, the topic chosen must address a compelling national or societal challenge. A topic area must also be a

good fit for that region, meaning that it must reflect the capabilities of the region – for example, by leveraging existing research or industrial activity – and address regional needs.

It is equally important that the topic be use-inspired and that the activities to be funded [ranging from research and development (R&D) to workforce development] have the potential to make tangible progress with respect to addressing the topic area and in creating new business opportunities that lead to the region's economic growth.

2. How broad must a topic area be?

The goal of the NSF Engines program is to advance emerging technologies and tackle bold, societal and economic challenges that will likely cross traditional definitions of industry clusters. Proposers should not limit their thinking to creating a cyber cluster or a biotech cluster but instead think about how disruptive R&D (potentially spanning multiple industries and technology areas) can make tangible progress towards addressing the specific topic area. It is not necessary for an NSF Engine to address all aspects of the topic area. However, the problem scope should be clearly defined.

3. Would NSF consider funding multiple NSF Engines in different regions that address the same topic or a similar topic?

Yes. NSF is open to considering Type-2 awards to multiple regions working on similar/related high-impact topic areas.

NSF Engine Phases

1. Is the definition of Growth, Emergent, or Nascent phase dependent on the topic area or overall strength of the innovation ecosystem?

The distinction is primarily dependent upon the strength of the innovation ecosystem as it relates to the proposed topic area.

2. How do we know if we are submitting to the correct type if our innovation ecosystem does not satisfy all the conditions in the Appendix A of the BAA (Characteristics of Various Phases of Innovation Ecosystems)?

These characteristics are provided solely as guidance to help proposers understand the various innovation ecosystem phases. It is not expected that each team will satisfy every characteristic listed. Ultimately each team will have to use its judgement. The proposal must provide a justification for the region's characterization of the state of its innovation ecosystem.

Proposal Budget

1. What should be funded by Type-1 budgets?

As specified in Section III.A of the BAA, Type-1 awards are intended to enable teams to lay the groundwork for submitting successful Type-2 proposals to establish full NSF Engines in the Nascent Phase. Type-1 budgets should support activities, events, and personnel contributing to the formation of a diverse and dynamic leadership team, fostering broad partnerships across all key regional stakeholders, and preparing a well-developed strategic plan that seamlessly integrates the NSF Engine's core functions (use-inspired R&D, technology transfer, and workforce development) and regional economic development activities. Budgets may be distributed across the Type-1 partners to support each partner's contributions to developing a competitive Type-2 proposal.

Budgets for Type-1 awards should not be used for carrying out technical research activities. The budget may include support for developing technology transfer and economic development infrastructure and outreach activities such as workshops, community listening sessions, or workforce development pilots.

2. Can NSF Engines budgets support academic-year salaries?

Yes. For example, faculty at institutions with high teaching loads may need academic-year support to fully participate in an award. When adequately justified against the workload of all activities with which an individual is tasked within the Engine, such support may exceed the limit of two months of salary that NSF normally requires from participating personnel. (See the NSF [PAPPG](#) for the policy on senior personnel salaries and wages).

3. Why is NSF only requesting a two-year budget for Type-2 proposals? How should the budget for years three and beyond be addressed?

For both Type-1 and Type-2 awards, NSF is requesting a two-year budget. Budget requirements, submitted annually, are for a “rolling” two-year period. Given the duration of Type-2 awards and the expectation that awardees will adapt to changing conditions and new opportunities, the two-year NSF budget structure provides flexibility to the awardees while ensuring adequate award oversight.

4. Can a Type-2 award include support for Ph.D. students or postdoctoral fellows?

Yes. However, the budget justification should clearly describe how their work will contribute to the use-inspired R&D, technology transfer, and workforce development goals of the NSF Engine.

5. Is there any guidance around how to allocate the budget for a Type-2 award across the various NSF Engine core functions (i.e., use-inspired R&D, technology translation, and workforce development)?

While all core functions of an NSF Engine are equally important, the relative use of NSF funds for activities relevant to each function may change as external resources and funds become available to leverage current NSF funds as the Engine matures. Proposals should clearly define the expected balance of activities related to core functions over the life of an Engine award and how those activities will be funded.

6. Does the NSF Engines team expect NSF funds to cover the full cost of an Engine?

No, NSF expects that Engines will need to obtain a significant amount of outside capital from state, federal, philanthropic, and corporate sources to achieve the full ambition of an Engine. NSF funds should be used to build institutional capacity; pilot and catalyze initiatives; and provide leverage to launch large-scale programs. NSF intends to be flexible in budget negotiations, for example, allowing academic-year salaries for faculty and providing participant subsidies that improve completion rates in workforce development programs. Engines should be built with an intentional focus on longer-term sustainability from the outset. As noted in the BAA, the NSF Engines program is a catalyst for sustainable growth of regional innovation ecosystems, and NSF funds are not intended to be the sole source of support. The assessment of an Engine’s ongoing performance will factor in the ability of the Engine to leverage additional funds and resources beyond the NSF award.

7. What kind of industrial and state leverage is expected?

There is no expectation of a specific level of leverage; however, one of the review criteria listed in the BAA for Type-2 proposals (Section VI.B.3.f) specifies consideration of the plan to raise additional outside funds to launch and scale the proposed Engine’s efforts. For Type-2 proposals, the NSF Engines program expects that some of this work will already be underway to develop a sustainable capital stack.

8. What are the expectations for financial contributions or cost-share from industry/corporate partners?

The BAA forbids voluntary cost-sharing. As noted above, each Type-2 proposal will be expected to demonstrate a plan and capacity to raise additional outside funds to launch and scale the proposed Engine’s efforts.

9. How does NSF view "for-profit" entities' participation in the NSF Engines program? Can they receive funding for their engagement?

For-profit organizations are permitted to receive funds under the NSF Engines BAA. For-profit organizations are permitted to serve as lead organizations as well as partners that receive sub-awards.

10. Can an NSF Engine use NSF funds as seed funds for start-ups?

Yes. An NSF Engine may use NSF funds for such activities as part of its overall strategic plan to accelerate the regional innovation ecosystem. The NSF Engine will be responsible for carrying out standard due diligence and addressing conflicts of interest. NSF Engines are strongly encouraged to discuss such plans with NSF.

11. Can an NSF Engine take an equity stake in a start-up?

Yes, but an NSF Engine aiming to pursue this approach as part of its business model must consult with NSF before implementing this strategy.

Evaluation Plan

1. The NSF Engines BAA specifies the need for a comprehensive evaluation plan. Does this need to be part of the initial proposal?

The initial proposal should include a preliminary evaluation plan as part of the proposal's management plan. Type-2 awardees will be required to develop a comprehensive evaluation plan within the first six months of the award and submit it for NSF approval. Once a proposal has been recommended for funding, NSF program staff will engage the awardees on this process. The evaluation plan is not a requirement for Type-1 awardees (or Type-1 proposals).

Proposal Review and Selection

1. How will the proposal review and selection process work? What kind of considerations will be taken by review panels in assessing the proposals?

All proposals (Type-1 and Type-2) will be reviewed by panels of external experts selected by NSF program staff with additional ad-hoc reviews, as appropriate. The NSF proposal review process, including the NSF Engines BAA specific review criteria, are described in Section VI.B of the BAA. NSF program staff take the advice of the review panels into consideration and make their own determination on the suitability of a proposal for an award. If NSF program staff determine that a Type-2 proposal is a potential candidate for an award, the proposing team will be invited to participate in a (virtual) site visit. Final award recommendations are made by NSF Engines program staff with the concurrence of NSF management.

2. What are the expectations of the pre-award site visit for Type-2 proposals? What happens afterward?

The proposing team will be given the opportunity to respond to weaknesses identified by the review panel, as well as answer additional questions from NSF program staff. Proposers may be asked to elaborate on aspects of their proposal.

After the visit, NSF Engines program staff may ask proposers to submit up to a ten-page reply, integrating proposal changes based on feedback from their site visit. NSF Engines program staff will factor in the results of the review panels and site visit in final NSF Engines funding decisions.

3. Can a region receive more than one Engine award?

NSF seeks to harness the geography of innovation that exists across the Nation, and therefore seeks to diversify the portfolio of Type-2 awards geographically. It is possible that a single region might receive more than one Type-1 award, in different topic areas.

4. How will NSF ensure that the best funded states do not get all the money?

An explicit goal of the NSF Engines program is to expand the geography of innovation and catalyze regional innovation economies in regions of the country that have not fully participated in the technology boom of the past several decades.

Award Management

1. Why are awards being made as Cooperative Agreements?

Cooperative agreements are used by NSF when substantial involvement is anticipated between the Government (in this case, NSF) and the recipient during performance of the contemplated activity. Cooperative agreements will enable NSF to tailor project-specific requirements and performance metrics for the Engines, while taking on an active role in oversight of award activities. Expected outcomes for NSF Engines in terms of workforce development, translation to practice, and business development will involve an ongoing collaboration between NSF staff and awardees to ensure that the Engines have the greatest opportunity to build thriving regional innovation economies.

2. Does receiving a Type-2 award guarantee that the NSF Engine will receive \$160 million over the ten-year period?

No, funding is not guaranteed. However, proposers will not need to continually reapply to unlock the next tranche of grant funding towards the \$160 million total. Once an applicant is awarded a Type-2 award and becomes an NSF Engine, the awardee progressively receives new tranches of funding as they achieve mutually agreed-upon milestones. Each NSF Engine Type-2 awardee must develop a comprehensive self-evaluation plan, negotiated with NSF, that establishes appropriate milestones (including criteria, goals, and metrics for success) befitting the vision of the NSF Engine. Awardees will be monitored and assessed on a regular basis including annual progress reports and targeted site visits. Failure to comply with the terms and conditions of the award or if the award no longer effectuates programmatic goals may result in early termination of the award.

3. What is expected in an annual project report?

Annual project reports are expected to include progress, outcomes, and metrics towards achieving the project goals described in the awardee's self-evaluation plan. Additional information that needs to be included in the annual project report will be outlined in the cooperative agreement between NSF and the awardee organization.

4. What happens if NSF decides to end an award early?

Prior to a determination to end an award early, NSF may work with the awardee on a mitigation plan. In the event of award termination, the awardee will be subject to a ramp-down in funds.

5. How will NSF measure growth/increased strength of our region over the grant duration?

All performance metrics will be developed by the awardee, in close collaboration with NSF, as part of a self-evaluation plan.

Other Questions

1. How does the NSF Engines program fit with other programs in the NSF Directorate for Technology, Innovation and Partnerships (TIP)? Are you open to proposers leveraging more than one TIP or NSF program?

The NSF TIP directorate has a mission to accelerate inclusive development and translation of science and technology innovations to equitably address critical societal and economic challenges. It seeks to develop a vibrant national science and engineering enterprise that embraces risk, co-creation, and co-design among stakeholders to advance critical and emerging technologies; develops new pathways to rapidly translate discoveries to practice; and fully engages the Nation's diverse talent pool. While most TIP programs address the many individual segments of the pathways that take ideas from the lab to the market and society, the NSF Engines program is unique in its ambition to implement this entire progression in a regional context to focus on use-inspired, innovation-driven solutions for a specific societal and/or economic challenge.

Proposers should consider the full range of programs that the TIP directorate and other NSF directorates have to offer and consider applying to them, as appropriate. It is NSF's desire that the Engines work collaboratively with other NSF-funded activities and avail themselves of research efforts (funded by NSF and non-NSF sources) being currently conducted in their aligned topic areas.

2. Does a Type-1 award require a full-time CEO? How about governance and advisory boards?

A Type-1 award does not require a full-time CEO. Type-1 awards are considered precursors to an NSF Engine. It is expected that Type-1 awardees will be establishing their core partners and identifying a CEO during the two years of funding. Similarly, governance and advisory boards are required only for Type-2 awards.

3. How aligned is the NSF Engines program with the EDA's Build Back Better Regional Challenge (BBBRC) applications? Would a good BBBRC application make a strong foundation for an NSF Engines application?

Applying to or receiving funding from the BBBRC does not make a team ineligible for an NSF Engines award. We expect that a team will leverage funds from many different sources to grow and scale the impact of an NSF Engine. However, the merit review process for the NSF Engines program is unique to NSF, and a proposal submitted to the NSF Engines program should specifically address the NSF Engines BAA.

NSF views the BBBRC and NSF Engines as complementary, not competitive. Both initiatives provide patient, long-term capital to drive regional capacity and national competitiveness. Through the NSF Engines program, NSF wants to create pathways into complementary programs that can speed up the innovation, commercialization, and economic-growth cycles. One or more NSF Engines could potentially overlap with a BBBRC awardee, which would drastically scale up a region's ability to commercialize its breakthrough technologies and cement its region of service as the world leader in that technology space.

4. Does the creation of the new TIP Directorate and its focus on use-inspired basic research, innovation ecosystems, translation, and industry partnerships imply that there will be less NSF funding focused on curiosity-driven, discovery-oriented basic research?

No. Funding for foundational research across the agency is not being reallocated to support the NSF Engines program.

5. Who will own the intellectual property developed as part of a Type-1 or Type-2 award?

Questions on intellectual property ownership and sharing are left to the NSF Engine (including all partners and stakeholders) to negotiate but are very important to the translational goals of the program. As noted in the BAA, an intellectual property management plan for Type-2 awardees must be submitted to NSF within six months of the award date.

6. How much latitude do proposers have in creating NSF Engines?

The NSF Engines program and the BAA are intentionally flexible – NSF wants teams/regions to have the flexibility to develop strategies and structures that are best suited to building a successful and specialized regional innovation economy. The BAA and the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* provide specific language on program and NSF considerations, respectively. For example, the type of organizations that may be lead or partners in NSF Engines proposal are specified in the BAA. If in doubt, feel free to contact the NSF Engines program team for guidance.

7. Does the project director (PD) on a LOI or submitted proposal (Type-1 or Type-2) need to be employed at the lead organization?

While it is typical that the PI/PD is employed by the lead organization, the NSF Engines BAA does not specify this as a requirement. The program recognizes that the PD may be associated with the Lead

organization but not employed by the lead. It is important to note that the lead organization is ultimately responsible for all award management/reporting and any other issues that may arise. Moreover, NSF will expect to interact directly with the PD with respect to awards requirements, including but not limited to evaluation, budgeting, project revisions, and planning activities (for Type-1 only). As such, the PD will need to have the ability to interact with NSF on behalf of the lead organization. It is important to note that, for Type-2 awards, an Engine CEO must be employed by the lead organization within six months of the award date.

8. An Excel template was provided for the Consolidated Personnel List but I'm confused about the choices of personnel types provided – how should I select the appropriate type?

- A. **Senior Personnel** – Those listed as PI/PD or coPI/PD (max is four), all of which should be members of the core leadership team. The PI/PD is responsible for all communications between NSF program officials and the project, relating to the aspects of the project, including, but not limited to, scientific, technical, workforce development, research translation, economic development, and budgetary aspects of the project. The PI/PD and any identified co-PIs/PDs, however, will be jointly responsible for submission of the requisite project reports. These individuals will be listed on the cover page. BAAM allows a max of four individuals to be added as PI/PD and Co-PI/PD.
- B. **Other Senior Personnel** – Key members of the project identified as part of the leadership team but not listed on the cover page as Senior Personnel (see A. above). This includes core members of the leadership team not listed on the cover page and other senior personnel with key roles in carrying out the Engines mission. This could include individuals leading the key components of the Engine such as, workforce development, translation to practice, use-inspired research, entrepreneurship, partnership development, etc.
- C. **Other Personnel** – these are funded members of the project that are making key contributions but are not part of the leadership structure. This could include faculty, scientists, engineers, post docs, professional staff, students
- D. **Subawardee Personnel** – key personnel at subaward organizations not already listed above
- E. **Collaborator Personnel** – key personnel from partner/collaborating organizations. This could include personnel from organizations that are not receiving NSF funds but are contributing resources to the project.

9. What are some examples of scientific areas that could be subjects for NSF Engines?

An Engine proposal should select a topic area that is relevant to the regional context and is aligned with the region's interests and strengths/assets. There are many such topic areas, and some exemplar topics are noted below. **It is important to note that these are not recommendations from the NSF Engines program nor do they indicate any preference for these topic areas by NSF; they are provided merely to illustrate breadth and depth of potential NSF Engines.**

A. Circular Bioeconomy

Creating a circular bioeconomy to enable a future world without waste constitutes a grand societal challenge. Today's modern economies have been built upon the linear "take-make-dispose" model, extracting resources to create products for consumption and subsequent disposal. This linear model depletes limited natural resources, ineffectively manages materials, and exacerbates climate change. There is an urgent need to transform these economies using a circular model that eliminates waste and reduces our negative impact on the regional and global environments we depend on.

All sectors of the bioeconomy must be transformed to circular models to enable a sustainable future. This will require balancing the potential value from new technologies against the imperative for conservation or recycling. For example: crop production systems must diversify the types and sources of plants grown for food, fiber, and feedstocks, while reducing the environmental impacts of farming; the 'blue bioeconomy' must tap sustainably the rich food reservoirs of oceans and coastal waterways, while enhancing the enormous potential for these ecosystems to capture and sequester atmospheric CO₂; and

biomanufacturing must harness AI-enabled end-to-end bioprocess and product design, powered by renewable energy sources and employing renewable or post-consumer feedstocks, to enhance sustainable production and transition to sustainably produced fuels, chemicals, and materials throughout the supply and value chains.

Common opportunities for science and technological innovation, societal engagement, and workforce development exist across all these sectors. Scientific advances will come from: leveraging the Earth's organismal and metabolic biodiversity; applying multidisciplinary approaches; taking advantage of emerging technologies, such as molecular biotechnology and artificial intelligence; and employing systems-level, data-driven strategies to tackle problems at all scales. Active engagement of stakeholders will help ensure robust understanding and integration of how societal, ethical, legal, and regulatory complexities and human behavior impact success. Incorporation of formal and informal educational practices aimed at a range of STEM professionals—from technicians to project managers and research scientists—and the broader community, together with partnerships with minority-serving institutions and institutions in rural regions will help produce a diverse workforce and help expand capacity.

B. Climate Change Resilience

Increasing regional resilience to climate-driven extreme events requires innovative approaches. A significant challenge is the identification and implementation of key interventions that enhance regional resilience. Convergent approaches are needed to enable rapid, accurate prediction of critical thresholds in biotic, biogeochemical, geophysical, and socio-environmental responses to climate-driven extremes; to advance novel nature-based, engineered, and hybrid approaches for improving resilience and adaptation of human-environment systems; and to promote sustainability of biodiversity and critical socio-environmental functions and infrastructure, including food, energy, communication, water, and economic security. Of particular importance is elucidating the elements of resilience in a fully integrated human-natural system that are generalizable and transferable for innovation beyond any one region or specific type of event.

Similarly, there is much opportunity for technological innovations and translational research that enhance greenhouse gas capture, sequestration, and utilization. Examples include: new technologies and tools to track, capture, convert, and sequester greenhouse gas cycles to guide a reduction in emissions in all types of systems and environments, novel solutions that scale risk modeling and assessment; new ideas for afforestation, sustainable forestry, soil carbon sequestration (biochar), natural greenhouse gas sequestration; reduction in energy use and increased energy efficiency across all sectors in the economy. Innovative and cutting-edge research can also advance understanding of effective policy instruments that foster behavioral change necessary to reduce greenhouse gas emissions and address the related legal and ethical dimensions.

C. Sustainable Materials

“Advanced” materials can be broadly defined as new materials designed with superior properties based on technological requirements, and there is an urgent need to address the sustainability of advanced materials in a holistic manner. The development and deployment of sustainable materials in areas of national priority are critical for multiple industrial sectors. Two such examples are the following.

1. Plastic materials have positively transformed many fronts of society since their mass integration into commercial systems; however, it has also become strikingly apparent that the plastics economy must be reformed to dramatically reduce plastic waste. To address this objective, regional coalitions can lead to:
 - Revolutionary and robust molecular design strategies that push towards a broad sustainable plastics deployment plan;
 - An ecosystem that incentivizes the collection, curation, and ready sharing of data from multiple stakeholders across the plastics production, use, and end-of-life sectors;
 - Innovative social, behavioral, and economic drivers that account for and manage waste appropriately; and

- Next-generation policies and training, workforce development, and educational programs that needed to bring about transformational change.
2. American built infrastructure has been under increasing strain due to aging and deterioration, inequalities in serving underprivileged communities, rising demographic and environmental demands, and unanticipated loads due to technological innovations. A future built infrastructure, materialized by sustainably renewing existing infrastructure and developing new construction at a regional level, can only be achieved with the deployment of new and visionary sustainable materials. Thus, a regional coalition could consider:
 - Significant advances in modeling and simulations based on physical properties and phenomena, as well as data-assisted design that support manufacturing technologies to enable the design, development, and integration of sustainable infrastructure materials;
 - The efficient, effective, and sustainable reutilization of waste materials streams from industrial processes not tied to the built infrastructure and from waste materials streams associated with removed or decommissioned structures; and
 - Pioneering long-lifespan sustainable infrastructure materials that are designed to offer a passive or low-power carbon capture function coupled with resilience during their service lifetimes such that the operational demands of the sustainable infrastructure materials allow for them to serve as carbon sinks.

D. Semiconductors and Post-Silicon Technologies

Semiconductor-based computer and electronic systems, which advance many aspects of our society and economy, have long benefitted from the exponential scaling trends in performance and efficiency characterized by Moore's Law, underpinned by ongoing innovations in materials, processes, devices, architectures, and assemblies. With the scaling benefits of Moore's Law now decelerating, and with related challenges such as the loss of domestic semiconductor fabrication and electronics manufacturing facilities, our nation faces economic and technological challenges demanding innovative and beneficial ways forward.

Specifically, advances are needed in the range and capabilities of semiconductor and post-silicon technologies, as well as reduction in cost and improvements in manufacturability and security of the applications of these technologies across computing, sensing, and communications. In addition to the convergent technology research itself, efforts are needed to further consider approaches for accelerating the transition of innovations throughout the technology stack – semiconductor materials to computing/communication/sensing applications—into regional and national economic impact. Expanding the Nation's capacity for semiconductor research and education will be most effective when encompassing approaches for broadening participation of a diverse workforce, coupling experiential learning and curricular enhancements at all levels.

As one example, linking physical resources (such as cutting-edge semiconductor and post-silicon fabrication facilities) to foundational and use-inspired research, and to novel and inclusive experiential education approaches, would create a vibrant regional ecosystem for electronics innovation and prototyping, offering jobs and benefits both to the local economy and to the Nation as a whole.