Fiscal Year 2018 Solicitation

Key Dates	
Solicitation Issue Date	December 14, 2017
Link to Pre-Recorded Informational Webinar	https://proposals.inl.gov/Home/TCF_Resources.aspx
Submission Deadline for Concept Papers (See Section IV)	January 23, 2018 at 8:00 p.m. (MT)
Submission Deadline for Proposals (See Section VI)	March 27, 2018 at 8:00 p.m. (MT)
Expected Date for Selection Notifications	Summer 2018

Summary Information	
Means of Submission	Applicants must register with and submit application materials through the Idaho National Laboratory's online application portal at https://proposals.inl.gov. OTT will not review or consider proposals submitted through any other means.
Total Amount to be Provided	DOE expects to make available approximately $18-$20 million of Federal funding for award(s) under this Solicitation. Future amounts are subject to congressional appropriations. DOE reserves the right to issue one, multiple, or no awards. Award amounts are: • Topic 1 Technology Maturation: $100,000-$150,000 • Topic 2 Cooperative Development: $250,000-$750,000
Period of Performance	Topic 1 Technology Maturation: 6-12 months Topic 2 Cooperative Development: 12-24 months Awarded projects in both topics are required to report metrics and participate in OTT's TCF program evaluation for up to 5 years from award date.
Eligible Entities	U.S. Department of Energy National Laboratories, Plants, and Sites
TCF Matching Funds/Non-Federal Cost Requirement	Projects require matching non-Federal funds of at least 50% of the total project cost.
Submission of Multiple Proposals	National Laboratories, Plants, and Sites may submit multiple proposals. There is no limit on the number of proposals a National Laboratory, Plant, or Site may submit.
Concept Papers	Concept papers are mandatory. Concept papers consist of information requested via an online form and an attachment for upload.
Proposal Forms	The proposal requirements are contained in this document. There is a five-page limit for Topic 1 Technology Maturation proposals. The page limit for Topic 2 Cooperative Development proposals is 10 pages. Proposals will only be accepted with a corresponding tracking number from an eligible concept paper.
Questions	Questions about the TCF program rules and proposal process should be directed to TCF@hq.doe.gov. Questions about using the online application portal should be directed to TCFsubmissions@inl.gov. Note: All questions and answers will be distributed via email to all applicants. Please do not provide proprietary or business sensitive information when posing questions to DOE or INL. **To allow adequate time for a response ahead of the submission deadlines, questions about Concept Papers must be submitted by 8:00 p.m. (MT) on January 18, 2018 and questions about Proposals must be submitted by 8:00 p.m. (MT) on March 22, 2018. Questions submitted after these deadlines may not be answered.**

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Section I: Background and Description of the Solicitation

A. SUMMARY

In support of the U.S. Department of Energy's (DOE's) efforts to increase the commercial impact of DOE National Laboratories, Plants, and Sites (hereinafter referred to as DOE Facilities) and their engagement with industry—as well as to fulfill statutory direction in the Energy Policy Act of 2005 (EPAct 2005)—DOE's Office of Technology Transitions (OTT) seeks proposals for its Technology Commercialization Fund (TCF). The TCF is intended to facilitate the commercialization of energy technologies with promising potential that are developed at DOE Facilities. The TCF is part of a broader set of initiatives to foster stronger partnerships among DOE Facilities, private sector companies, and other entities involved in bringing energy technologies to the marketplace. EPAct 2005 encourages and supports the development of energy systems across the entire range of generation sources. DOE strongly encourages applicants to look across their portfolios of applied energy programs for candidate technologies. A complete list of eligible technology areas is provided in Appendix A.

B. GOALS

The TCF is part of a broad array of activities that DOE and its Facilities undertake to ensure Federal research and development (R&D) investments in technology with commercial potential to find their way to a viable market. The TCF Federal funds are matched with non-Federal contributions to:

1. Perform technology maturation with the intent of attracting a private partner that is willing to support the technology's commercialization.
2. Support cooperative development of technology with a private partner for a specific commercial application.

C. BACKGROUND

DOE's enterprise of Facilities has a more than 70-year history of delivering world-class science and technology solutions to pressing national issues. DOE Facilities are proven partners in collaborative R&D projects that provide the foundational science and technology for the private sector to then derive new products and processes in myriad industries. DOE's annual multibillion-dollar investment in research at DOE Facilities results in the invention and development of novel technologies and other forms of intellectual property (IP). DOE Facilities have developed partnerships with private parties to pursue commercial applications of these technologies. To date, there have been thousands of licenses between DOE Facilities and private partners. Nevertheless, an even larger reservoir of IP has not transitioned to the private sector because a technology may not be mature enough to attract a partner—or its market potential may not be fully understood.

DOE's Facilities have consistently identified as a problem the lack of sufficient resources to develop technologies to a stage that attracts private sector interest. In many cases, public funding—from DOE or other sources—supports R&D activities up to an early Technology Readiness Level (TRL), but such funding is cut off before the technology matures to a point that a business will enter into a cooperative R&D agreement or seek to license the technology. A 2013 report commissioned by the White House Office of Science and Technology Policy concluded that "[m]any

promising early-stage technologies developed at Department of Energy [N]ational [L]aboratories require 'maturation' in the form of additional development, testing, or prototyping before companies are willing to invest in them for commercial purposes."[a]

[a] IDA Science and Technology Policy Institute. "Department of Energy Technology Maturation Programs." May 2013. Available online at: https://www.ida.org/~/media/Corporate/Files/Publications/STPIPubs/ida-p-5013.ashx (accessed December 8, 2017).

Congress authorized under Section 1001 of EPAct 2005, as amended, the establishment of the Technology Commercialization Fund (TCF):

> *e) TECHNOLOGY COMMERCIALIZATION FUND – The Secretary shall establish an Energy Technology Commercialization Fund, using 0.9% of the amount made available to the Department for applied energy research, development, demonstration, and commercial application for each fiscal year based on future planned activities and the amount of the appropriations for the fiscal year, to be used to provide matching funds with private partners to promote promising energy technologies for commercial purposes.*

The TCF provides an opportunity to support collaboration between DOE Facilities and private industry. Specifically, the TCF is intended to incentivize DOE Facilities to pursue active industry engagement and customer scouting for select, promising energy technologies. Researchers at DOE Facilities, as well as their technology transfer offices, often lack the resources or a particular DOE Program Office's guidance to focus on actively engaging industry partners to commercialize their technologies.[b, c]

Through TCF, DOE's four applied energy Program Offices (discussed in Appendix A) and its Facilities can pursue a strategic, forward-looking, competitive approach to commercializing their technologies. This process better enables DOE Facilities to prepare these technologies for commercial adoption, identify the highest-quality prospective partners, and assist those industry partners in evaluating the technologies for their business models. Potential benefits of this approach include:

1. Creating a stronger incentive for DOE Facilities to identify both their most promising technologies for commercialization and industry partners
2. Empowering a broader set of potential industry partners to engage with the DOE Facilities
3. Enabling DOE Facilities to identify a commercialization pathway for technologies with good potential
4. Promoting crosscutting technologies across DOE's Program Offices and technology areas

D. TCF STRUCTURE

Proposals must pursue one of the following two Topic Areas:

Topic 1 Technology Maturation

Topic 1 Technology Maturation projects focus on DOE Facility-developed technologies that have commercial promise, have reached a TRL of at least three (TRL 3), and have the potential to attract a private partner. The target TCF funding for each Topic 1 award

[b] OTT 2015 RFI input from the National Laboratories put significant emphasis on the importance of more strategic industry engagement in order to attract industry and identify partners to commercialize technology.

[c] A key finding from the temporary EERE Technology Commercialization Fund from FY2007-2008 found that National Laboratories would have benefited from additional time and resources to search for the most promising industry partners.

is $100,000-$150,000. The target period of performance for a Topic 1 award is 6-12 months.

Topic 2 Cooperative Development

Topic 2 Cooperative Development projects focus on technologies for which DOE Facilities have already identified a commercial partner willing to execute a Cooperative Research and Development Agreement (CRADA). This Topic supports cooperative development with a private partner of a commercial application for technology developed at DOE Facilities. Applicants will have already undertaken some form of evaluation to determine if the technology is viable for commercialization—such as IP mapping, participation in the Energy I-Corps program, or other activities. The target TCF funding for each Topic 2 award is $250,000-$750,000. The target period of performance for a Topic 2 award is 12-24 months.

OTT has implemented a metric and evaluation plan to assess progress and achievements of TCF-funded Topic 1 and Topic 2 projects. All Awardees are required to provide metrics for up to five years from the award date.

E. SCOPE OF PROJECTS

The scope of a project should allow it to meet TCF's goals for the type of project it is—i.e., technology maturation or cooperative development. The activities described below correlate to the independent merit review criteria in Section IV. All projects, whether proposed as Topic 1 or Topic 2, need to address the four areas described here. Depending on the Topic area, the breadth and level of detail will vary. In all cases, proposals must address the following items to the degree of specificity appropriate to the chosen topic area.

1. **Commercial Impact**
   Both Topic 1 and Topic 2 proposals need to address the proposed technology's potential market impacts if it is commercialized. Topic 1 projects are intended to focus on technology maturation, but need to provide evidence that the technology has potential market impact. Topic 2 projects are intended to focus primarily on the commercialization of the technology in concert with a private partner. Therefore, a Topic 2 proposal should contain more expansive information about the commercial impact of the technology. In any case, there must be a clear explanation of the current or anticipated market for the technology. This should include a description of the significant market need that the project addresses. The applicant should also specify whether the proposed technology could achieve market penetration independent of complementary technologies, processes, or other requirements. If other factors, such as policy or regulations, are required for the technology to achieve market penetration, the applicant should identify them and discuss the circumstances.

2. **Technical Maturation**
   Proposals for both Topic 1 and Topic 2 need to address what the project intends to accomplish in terms of advancing the maturity of the technology. Topic 1 projects are intended to focus on technology maturation as the primary objective. Therefore, the proposal should be principally focused in this area. Topic 2 projects may require that the technology be further matured

or demonstrated at a larger scale. Topic 2 proposals should describe which technology maturation activities need to be undertaken to achieve the commercialization goals of the project. In any case, there must be a clear explanation of the current state of the technology, as well as the anticipated state of the technology at the end of the project. To the degree they can be anticipated, the applicant should explain the technical challenges and unanswered technical questions that must be addressed to reach the desired maturity of the technology. There should be an explanation of any complementary technology(ies) necessary for the proposed technology to function and to have relevance in the market.

3. **Project Plan**

   Both Topic 1 and Topic 2 proposals need to include a project plan, which should center around the objectives of the project. Depending on the topic area and the specific project objectives, the plan should focus on tasks and activities to accomplish those objectives. There must be a clear explanation of the goals and outcomes of the proposed project, and a viable approach to address the technical and commercialization challenges of bringing the technology to the market. Tasks should be clearly linked to performance metrics and deliverables. There must also be a delineation of technical and market risks and uncertainties, as well as a plan to manage or retire them.

4. **Project Team and Resources**

   There must be a clear articulation that the project team and resources are qualified and capable of successfully completing the project. This includes both the laboratory and partner teams. The proposal must clearly define team members' roles and responsibilities. There should be evidence that the necessary personnel, facilities, and equipment are available and committed to the project.

Section II: Eligibility for Award

Applicants for a TCF award are required to meet the eligibility requirements described in this section.

A. APPLICANTS

Eligible applicants are any DOE Facilities as defined in Section I to include the U.S. Department of Energy National Laboratories, Plants and Sites.[d] No other entities, public or private, are eligible for award. Applicants are eligible for multiple awards under this solicitation. Multiple DOE Facilities may partner together on a single application.

B. PROJECTS

Eligible applicants may propose projects under one of two topic areas:

Topic 1 Technology Maturation
Topic 2 Cooperative Development

Topic 1 projects may—but are not required to—involve a partner. Topic 2 projects must involve a partner. TCF projects that involve partners are expected to use a CRADA as the partnering mechanism. If a Facility wishes to use a different partnership mechanism for a specific project, it must secure permission ahead of time from OTT for the deviation. Requests should be submitted to TCF@hq.doe.gov and must include a justification for using an alternate mechanism. After consulting DOE's Office of General Counsel, OTT will respond in writing to either approve or disapprove the request.

Topic 1 Technology Maturation—$100,000-$150,000 per award

Eligible projects for Topic 1 must involve currently existing DOE Facility technology or IP with a TRL of at least three (TRL 3) that demonstrates evidence of commercial potential. TRL 3 is evidenced by a technology having demonstrated analytical and experimental proof of concept in a laboratory environment. For example, have either experiments or modeling and simulation validated performance prediction of technology capability? Have design techniques been identified or developed? Have scaling studies been initiated? Projects funded under Topic 1 have a performance period of 6-12 months. The target Topic 1 award amount is $100,000-$150,000.

Topic 2 Cooperative Development—$250,000-$750,000 per award

Eligible projects for Topic 2 must involve currently existing laboratory technology or intellectual property, and the laboratory must have a non-Federal partner with a defined commercial application for the technology. The partner(s) must be identified in the application for funding. A CRADA does not have to be in place to be eligible for award, however. If funds are allocated before a CRADA is in place, work may not begin until it is executed. If a CRADA between the laboratory and partner is not executed within 6 months of the award, the Department may cancel the award. A project or work scope being executed under an existing CRADA or other partnership agreement is not eligible for an award under the TCF. Projects funded under Topic 2

[d] NETL is ineligible for an award for a Topic 1 project unless it finds a private partner.

have a performance period of 12-24 months. The target Topic 2 award amount is $250,000 to $750,000.

Additional Funding Eligibility Considerations

If a technology received funding as a Topic 1 project, it may be eligible to receive funding as a Topic 2 project, provided the following conditions are met: the project is complete and was successful in accomplishing the project's goals; the project has complied with all reporting requirements; and the new funding request meets the Solicitation's requirements and advances the technology toward commercialization.

If a technology received funding as a Topic 1 project, it is not eligible for additional TCF funding as a Topic 1 project.

If a technology received funding as a Topic 2 project, it is not eligible for additional TCF funding.

Relevance Considerations

All projects proposed for funding must demonstrate mission area relevance to one or two of the DOE Program Office Technology Areas (i.e., Congressional control accounts) identified in Appendix A. It is incumbent on applicants to identify and select the correct Program Office(s) and Technology Area(s). DOE Facilities may submit proposals with cross-programmatic application or benefit. As an example, a wind farm load forecasting model could be applicable to the Wind Energy Technology Area within the Office of Energy Efficiency and Renewable Energy, as well as to the Transmission Reliability Technology Area within the Office of Electricity Delivery and Energy Reliability.

C. PARTNERS

Partners can be any non-Federal entity, including private companies, state or local governments—or entities created by a state or local government—universities, or non-profit organizations. Partners must agree to engage in activities that focus on commercializing or deploying technologies in the marketplace.

D. MATCHING FUNDS

All projects require matching funds of at least 50% of the total project cost, which must come from non-Federally-appropriated funds. If a DOE Facility is providing the matching funds, it must be a cash contribution. If a private partner is providing the matching funding, it can be a cash or in-kind contribution. Applicants should ensure that in-kind contributions meet all of DOE's requirements pertaining to in-kind contributions. DOE Facilities are ultimately responsible for verifying that all matching contributions are made and properly accounted for. For more information and examples, please see Appendix B.

Section III: Award Information & Administration

A. TYPE OF AWARD INSTRUMENT

TCF awards will be documented and funded through the existing work authorization and funds management processes of the DOE Program Office providing the funding. DOE Facilities will be required to track Federal funds in accordance with normal Departmental processes. DOE Facilities will also be required to track non-Federal funds in accordance with established DOE Facility accounting processes.

B. ESTIMATED FUNDING

DOE anticipates that approximately $18-$20 million will be available for the TCF in Fiscal Year (FY) 2018. Future amounts are subject to congressional appropriations. DOE may issue one, multiple, or no awards.

Number of Selections: The number of selections will be based on the number of meritorious applications and the availability of congressionally appropriated funds in each DOE Program Office or Technology Area.

Funding will be allocated from one or two appropriation accounts/Technology Areas listed in Appendix A.

Funding Amount per Selection:

Topic 1 Projects - $100,000-$150,000 per award
Topic 2 Projects - $250,000-$750,000 per award

DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Solicitation.

C. PERIOD OF PERFORMANCE

Topic 1 projects: 6-12 months
Topic 2 Projects: 12-24 months

D. CROSSCUTTING AWARDS AND MISSION AREA RELEVANCE

DOE Facilities may submit proposals they view as having crosscutting applicability or benefit. At the mandatory Concept Paper stage, applicants may identify up to **two (2)** Technology Areas per proposal, and **must** provide a short explanation for **each selection** that articulates the technology's mission area relevance. DOE is under no obligation to accept an applicant's determination of crosscutting applicability. DOE reserves the right to make final determinations about which Program Offices will bear what share of the costs for crosscutting awards.

E. MULTIPLE AWARDS

DOE Facilities are eligible for more than one award. Awards are made on a per application basis. Each application must define a single project. Single applications are not eligible for multiple awards.

F. DECISION NOTIFICATIONS

DOE's decisions are final when communicated to applicants. OTT notifies each application's point of contact in writing of its decisions and provides a summary to

each Facilities' Tech Transfer Office. The first notification follows the Concept Paper eligibility review. This is a go-no-go decision that determines whether or not DOE will accept a Full Application for the corresponding Concept Paper.

Notification of DOE's TCF selection decisions follows the conclusion of the evaluation and selection process. DOE's decision to select a project for award is not an authorization to begin performance. Selected projects are required to finalize the Scope of Work (SOW)/Work Plan with the funding Program Office(s) prior to work authorization and release of funds. OTT and/or the funding DOE Program Office(s) reserve the right to request additional or clarifying information before proceeding to the SOW finalization stage.

OTT provides reviewer comments to all applicants as soon as practical after selections are announced.

G. SUCCESSFUL SUBMISSIONS

If selected for award, OTT reserves the right to require additional or clarifying information for any reason.

H. PROJECT ADMINISTRATION

Projects selected for award are managed by the DOE Facilities in accordance with their requisite policies and procedures. Each awarded project will be funded according to the Program Office Technology Areas (Congressional control accounts) listed in Appendix A. Applicants are encouraged to select up to two Program Office Technology Areas as applicable to their project's crosscutting potential—and to its mission area relevance to each selection. Please see the description of mission area relevance reviews within Section IV for more information.

The template for TCF-funded project's final report is in Appendix C.

Section IV: Proposal Requirements and Review Information

A: CONCEPT PAPERS AND ELIGIBILITY REVIEWS

Concept Papers are mandatory and will generate upon creation a discrete tracking number for use during the full submission phase. The deadline to submit Concept Papers is **8:00 p.m. (MT) on January 23, 2018. Concept Papers submitted after this time will not be accepted.**

At the Concept Paper stage, applicants must select a Primary Technology Area to which their proposal relates. Applicants may also select an optional Secondary Technology Area. Primary and Secondary Technology Areas may be within different DOE Program Offices, or within the same DOE Program Office. All Concept Papers are subject to an eligibility review to determine whether or not DOE will accept a Full Application for the same project. OTT's multi-phase eligibility review is in place to determine:

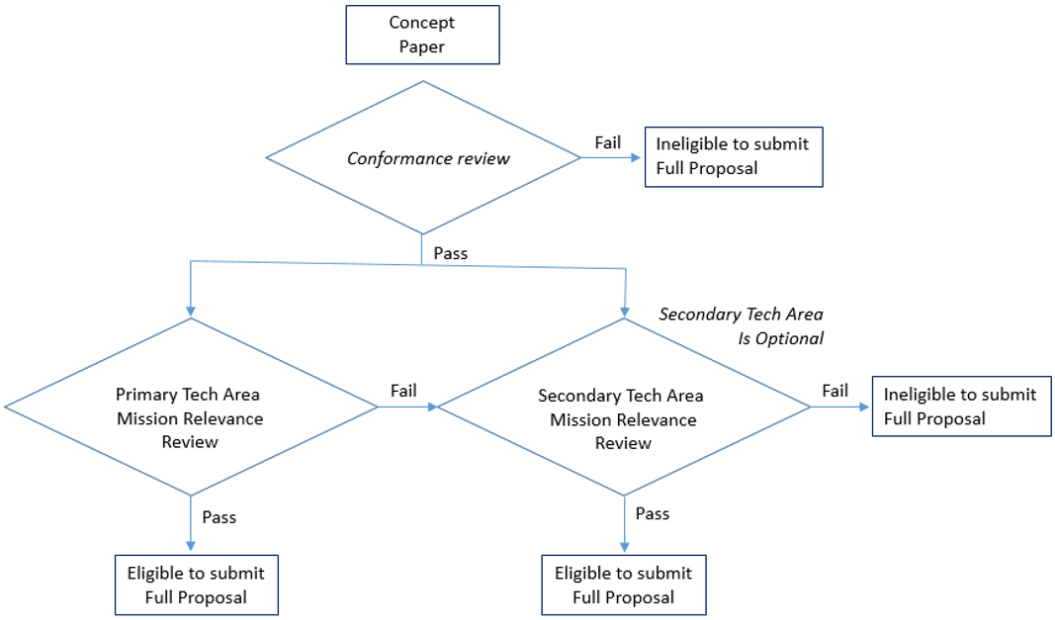
1. That the applicant is an eligible entity under this solicitation
2. That the Concept Paper is complete and contains all the required information
3. That all mandatory requirements are satisfied
4. That the Concept Paper describes a project responsive to this Solicitation's objectives
5. That the Concept Paper demonstrates and accurately articulates mission area relevance to the applicant-selected Program Office(s) and Technology Area(s).

Conformance and Mission Area Relevance Reviews

Items 1-4 above describe the conformance review for a Concept Paper. In addition to this conformance review, Concept Papers also receive a review for mission area relevance in the applicant-selected Technology Area(s). This is captured in item 5 above. To be eligible to submit Full Proposals, Concept Papers must pass both the conformance review **and** the relevance review in **at least one** of the applicant-selected Technology Areas—Primary (mandatory) or Secondary (optional).

If an applicant only selects a Primary Technology Area, and the Concept Paper fails that mission area relevance review, the applicant is not eligible to submit a Full Proposal for that Concept Paper. If a Concept Paper fails the mission area relevance review in the Primary Technology Area, it may still pass in a Secondary Area, if the applicant selected one. In that case, the Secondary Technology Area becomes the new Primary Technical Area.

The Concept Paper review processes are depicted in the diagram below:



Concept Papers that fail the conformance review or do not pass at least one mission area relevance review are eliminated from further consideration. DOE will not accept full proposals for those Concept Papers. DOE anticipates making eligibility notifications by 5:00 p.m. (MT) on February 23, 2018.

B: FULL PROPOSALS AND ELIGIBILITY REVIEW

Proposals will only be accepted with a corresponding tracking number from an eligible Concept Paper—and only in the Technology Area(s) in which it passed the mission area relevance review(s). Proposals submitted after the proposal deadline of **8:00 p.m. (MT) on March 27, 2018** will not be reviewed. All Full Proposals will be subject to an eligibility review to determine that:

1. The Full Proposal matches the project described in the corresponding Concept Paper
2. The Full Proposal for funding is complete and contains all the information required
3. All mandatory requirements are satisfied
4. The proposed project is responsive to the objectives of this Solicitation

Proposals that fail to pass the eligibility review in the manner described above will not be forwarded for independent merit review and will be eliminated from further consideration.

C: MERIT REVIEW CRITERIA

Proposals that pass the eligibility screen will be forwarded for independent merit review. Proposals are independently merit reviewed only in their Primary Technology Areas. OTT makes use of Secondary Technology Areas during the Merit

Review Committee meeting in cases where possibilities might exist to fund meritorious projects after funding is exhausted in the Primary Technology Area. TCF Selections are based on the following merit review criteria:

1. **Commercialization Evaluation (35% of composite score)**
   Commercial Impact Criterion consist of the following components:
   - Extent to which the proposed technology will result in a commercially-successful product and/or company
   - Extent to which the proposed technology has the ability to be successfully commercialized in a reasonable timeframe (3-5 years)
   - Extent to which the proposed technology represents an innovative or significant improvement from current state of the art technologies that results in either a product or solution that transforms or replaces existing industry approaches or is a new product or solution that can be widely used by the existing industry and will have significant market impact
   - Extent to which the project team understands the market and its barriers to commercialization
   - Extent to which the applicant identifies and discusses factors or circumstances such as policy or regulations are required for the technology to achieve market penetration

2. **Technical Merit Evaluation (65% of composite score)**
   Technical Impact consists of three criteria within which are multiple components as described below along with their individual contributions to this portion of the composite score:

   Technical Merit Criterion 1: Technology Maturity (40%)
   - Technology has achieved a TRL 3, which is defined as a technology having demonstrated analytical and experimental proof of concept in a laboratory environment. For example, have experiments or modeling and simulation validated performance prediction of technology capability? Have design techniques been identified or developed? Have scaling studies been initiated?
   - Extent to which the applicant describes an understanding of complementary technologies or processes that are necessary for the technology to have relevance in the market.
   - Extent to which the applicant describes an understanding of technical issues to be addressed to achieve a successful commercial deployment.
   - Evidence that the technology can be deployed at scale.

Technical Merit Criterion 2: Project Plan (40%)

- Technical and Commercialization Approach –
    - Quality and reasonableness of the applicant's plan for closing technical gaps and addressing unanswered technical questions.
    - Quality and reasonableness of the applicant's business plan for market penetration/adoption.
- Risk Management –
    - Extent to which applicant discusses and demonstrates understanding of the key technical and commercial uncertainty and risks involved in the proposed work.
    - Extent to which applicant adequately describes how applicant's team will manage and retire risks.
- Goals and Outcomes –
    - Extent to which the project plan clearly describes the goals and outcomes of the project, including measures of technical advancement and business success.
    - Extent to which the proposed tasks and subtask activities in the work plan are verified through performance metrics, milestones, and deliverables that are specific, measurable, aggressive (but attainable), realistic, and timely (i.e., not a report summarizing work that was done).

Technical Merit Criterion 3: Project Team and Resources (20%)

- Capabilities – The extent to which the capability of the Principal Investigator(s) and the proposed team, including partnerships, can address all aspects of the proposed project, including, but not limited to, qualifications, relevant expertise, and time commitment of the individuals on the team.
- Contributions – Clarity, adequacy, and completeness of roles and contributions of each team member in development of the project and/or commercialization of the products, including financial support of partners.
- Readiness – Extent to which the final team, facilities, and equipment required to complete this project is fully in place, assembled, and committed to the project (e.g., are there any key members that are "to be hired at a later date"?).
- Commitment – Extent to which there is demonstrated institutional commitment from senior DOE Facility management and corporate officers of partners.
- Resources –Sufficiency of facilities to support the proposed work—and reasonableness and adequacy of the proposed budget to meet proposed project objectives.

D: PROGRAM POLICY FACTORS

In addition to the criteria above, the following program policy factors may be considered in determining which proposals to select for negotiations:

- The degree to which the proposed project offers an opportunity to facilitate commercialization of a promising technology that does not currently have other programmatic support.
- Whether the proposed project offers crosscutting or multi-program benefit and passed the mission relevance review in both its Primary and Secondary Technical Areas.
- Diverse representation of DOE Facilities in the TCF's project portfolio.
- Diversity of technologies.
- Diversity of projects spanning participating DOE Program Offices.

Section V: Proposal Submission & Format

A. PROPOSAL SUBMISSION INFORMATION

Application forms and instructions are available at the TCF submission website. To access these materials:

1. Go to https://proposals.inl.gov
2. Select "Login" from the top right-hand corner of the screen
3. Enter your user credentials or create an account
4. Select "Applications" from the menu
5. Click on "Create New Application" for the type of application you are creating.

B. DOCUMENT FORMAT REQUIREMENTS

Using templates where provided, all non-budget documentation is to be prepared in a standard 8.5" × 11" document with 1-inch margins all around (i.e., top, bottom, left, and right), using a font size no smaller than Times New Roman 11 point. The required file format is Portable Document Format (PDF) for all documents except for spreadsheets. **Applicants should not scan and then upload their proposals as this will cause them to fail the conformance review**. All spreadsheets are to be uploaded in Excel file format. Do **NOT** lock any cells in the spreadsheet.

C. PROPOSAL ELEMENTS

1. **Concept Papers**

   Concept Papers are mandatory. Concept Papers consist of information requested via an online form and an attachment for upload. Both must be submitted here: https://proposals.inl.gov by **8:00 p.m. (MT) on January 23, 2018**. The applicant's point of contact should receive an email acknowledging receipt of the proposal within one (1) business day of submission. Facility Tech Transfer Offices should receive a summary of their Concept Papers within three (3) business days following the submission deadline. Please contact TCFSubmissions@inl.gov if a receipt is not received.

   a) **Concept Paper Project Administrative Detail and Summary**

      Information about the project and the applicant's contact information is requested via the Project Administrative Detail and Summary, which is completed via an online form. All information fields are mandatory. The form asks for the following information:

      i. Project Title. Text box provided on form.
      ii. Identification with check boxes from a tree menu of a Primary Program Office/Technology Area (mandatory) and an optional Secondary Program Office/Technology Area to which the project aligns, and an explanation of each selection. A text box is provided on the online form. Please see Appendix A for a list of the eligible Program Offices and their Technology Areas.
      iii. Period of Performance (6-24 months). Text box provided on form.
      iv. Brief Overview (for public release). Text box provided for a short description of the proposal (300 words or less). DOE uses

this information to assist in identifying Subject Matter Experts (SMEs) to serve as independent merit reviewers.

v. Principal Investigator (PI) Information. Text box provided for name, phone number, primary email address, and alternate email address.
vi. Lead DOE Facility. Select from drop-down list.
vii. Topic Selection. Drop-down menu provided on form.
viii. Proposal's Point of Contact. Use the text box to provide salutation, first and last name, organization, phone, email, country, state, and city.
ix. Partner Organization(s) and Points of Contact (name and email), if applicable. Use the text box to provide salutation, first and last name, organization, phone number, email address, city, state, postal code, and country.
x. Previous TCF Funding. Use a Yes/No radio button to answer whether the TCF previously funded this project and/or technology. Topic 1 projects that received funding under an earlier Topic 1 award are not eligible for additional TCF funding. Likewise, Topic 2 projects that received funding under an earlier Topic 2 award are not eligible for additional TCF funding. However, Topic 2 projects that received TCF funding under an earlier Topic 1 award are eligible to apply for additional TCF funding provided the following conditions are met: The project is complete and was successful in accomplishing the its goals and objectives; the project has complied with all reporting requirements; and the new funding request meets the Solicitation's requirements and advances the technology toward commercialization.

Please note that the Project Administrative Detail and Summary form includes the following affirmation:

> *I, my home organization, and my proposed partner(s) have read and agree to the requirements as they are outlined in the Solicitation. Agreement by all parties to these requirements is indicated upon submission.*

b) Concept Paper Narrative

Applicants must upload a Concept Paper narrative document. The document must contain the following information:

i. Project Title
ii. Tracking ID #
iii. DOE Facilities(s)and proposed Partner(s), if applicable
iv. A brief project narrative not to exceed 5,000 characters (including spaces and punctuation), which DOE may use for public release (selected projects only)

The document must be saved as PDFs, and conform to this naming convention: 2018 TCF Concept Paper "Tracking ID #".pdf

Note: All information included in the Concept Paper will be visible on the application form once created in the submission system.

2. Proposals

Proposals must be uploaded to https://proposals.inl.gov by **8:00 p.m. (MT) on March 27, 2018**. The applicant's point of contact should receive an email acknowledging receipt of the proposal within one (1) business day of submission. Facility Tech Transfer Offices should receive a summary of their proposals within three (3) business days following the submission deadline. Please contact TCFsubmissions@inl.gov if a receipt is not received. Proposals may include an appendix of team members' resumes and/or letters of support (but no other information or materials). Topic 1 proposals must not exceed five (5) pages and Topic 2 proposals must not exceed ten (10) pages. In both cases, these page limits exclude the following supplemental pages: Budget form, technical summary/abstract for public release, and any appendix of team members' resumes and/or letters of support. Only the first 5 pages of a Topic 1 proposal and the first 10 pages of a Topic 2 proposal will be reviewed. DOE leaves it to applicants' judgement to best determine how to allocate the page allotment.

To create a full proposal, login to the https://proposals.inl.gov site as before and click the "Create New Application" link next to the Fiscal Year 2018 Technology Commercialization Fund Full Application. The submission system will show the Concept Papers you already submitted. When you click on the desired Concept Paper, the system will generate the full application page. The tracking number will be the same and all information except the Concept Paper attachment itself will appear in the full application form. That information can be updated as needed. Scroll down immediately and save the application.

Note: Applicant must provide information for each of the elements described below; however, the depth of the discussion for each element will depend on whether the proposal is seeking funding under Topic 1 or Topic 2.

a) Technical Summary/Abstract for Public Release (PDF Attachment). The project summary/abstract must be suitable for dissemination to the public, and it must not exceed one (1) page. It should be a self-contained document that identifies the name of the applicant; the project director/PI(s); the project title; list of major deliverables; scope and objectives of the project; a description of the project, including major tasks (phases, planned approach, etc.) and methods to be employed; the potential impact of the project (i.e., benefits and outcomes); and major participants (for collaborative projects). This document must not include any proprietary or business-sensitive information because DOE may make it available to the public, if the project is selected for award.

The document must be saved in Portable Document Format (PDF), and conform to this naming convention: "2018 TCF Abstract [Tracking ID #].pdf".

b) Commercialization Plan (PDF Attachment)

Please identify the following information in this document:

i. The target market(s) for commercialization of the technology/product, including a brief discussion of identified or anticipated market barriers.

ii. Competing technologies/products and estimated timeframe to overcome technical and market barriers.

iii. Proposed commercialization end state of the project, to include whether the technology/product will be available in the identified markets—and if not, the anticipated follow on activities necessary to bring the product to market.

iv. The extent to which the proposed technology will result in a commercially-successful product and/or solution that transforms or replaces existing industry approaches or solutions that can be widely used by the existing industry.

v. Clear statement of how the proposed technology represents an innovative and significant improvement with respect to existing commercial products or solutions.

The document must be saved in Portable Document Format (PDF), and conform to this naming convention: "2018 TCF Commercial Impact [Tracking ID #].pdf".

c) Technical Narrative (PDF Attachment)

This document should include the following information:

i. **Project Description** - Describe the project's goals and objectives. Provide a brief history of the technology development and commercialization efforts to date including current status.

ii. **Project Plan -** Describe the technical and commercialization approach for the project including how you will close technical gaps and address unanswered questions. Clearly state what the business plan for market penetration/adoption is and how you have addressed any assumptions used to form your business strategy. Describe how you will manage technical and commercial risks related to your proposed work and how you will retire those risks as they arise. Clearly articulate the goals and outcomes of the project, including measures of technical and business success.

In addition to the written summary, provide a table with milestones to include a description of the outcomes or goals being achieved. Milestones should be specific, measurable, achievable, realistic, and time-bound (SMART) and represent a tangible and measurable achievement of a project outcome or goal, e.g., completion of a technology upgrade or performance test. The table should also include deliverables with a description of the data and information or knowledge being provided in the deliverable.

iii. **Team & Resources -** Describe the capabilities of the project team, including those of the PI(s), partners, and other members, and how each will contribute to the commercialization of the product. Clearly state the team's and the lab's readiness to begin work on the project. Describe the team's commitment to the project, including that of senior laboratory management and corporate officers of partner organizations. Describe the facilities needed to support the proposed work. As appropriate, include the names of any partners and a description of their businesses, as well as a discussion of the partners' products and services currently in the market. Describe the history of the laboratory's interaction with the partner(s) and the role of the partner(s) in the project including their responsibilities for accomplishment of milestones and deliverables, as well as financial support or in-kind contributions.

The document must be saved in Portable Document Format (PDF), and conform to this naming convention: "2018 TCF Technical Narrative [Tracking ID #].pdf".

d) Budget (online form and an Excel file)

Please complete the online form to provide the following information:

i. TCF Funding Requested
ii. Non-Federal Matching Funds
iii. Proposed Total Budget
iv. Non-Federal Source Verification (Checkbox)

Use the budget template (provided online) to submit the following information:

i. Budget by year for the project (FY 2018 and FY 2019, if applicable)
ii. Budget by cost category:
    - Personnel
    - Travel
    - Equipment
    - Supplies
    - Contractual
    - Other
        - Total Direct Charges
    - Indirect Charges
        - Total Project Costs
    - Non-Federal Contributions
        - Cash
        - In-Kind

The template must be saved as an Excel file, and conform to this naming convention: "2018 TCF Budget [Tracking ID #].xlsx".

Section VI: Other Information

A. MODIFICATIONS

Notices of any modifications to this Solicitation will be distributed via email to the points of contact identified in the list in Attachment C.

B. TREATMENT OF PROPOSAL INFORMATION

In general, OTT will use data and other information contained in proposals for evaluation purposes only, unless such information is generally available to the public or is already the property of the Government.

Applicants should not include in their proposals trade secrets or commercial or financial information that is privileged or confidential, unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in this Solicitation. Proposals that contain trade secrets or commercial or financial information that is privileged or confidential—and that the applicant does not want disclosed to the public or used by the Government for any purpose other than proposal evaluation—must be marked as described below. A cover sheet, which does not count against the page limits, must be marked as follows, and must identify the specific pages that contain trade secrets or commercial or financial information that is privileged or confidential.

Notice of Restriction on Disclosure and Use of Data:

> "Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]"

The header and footer of every page that contains trade secrets or privileged commercial or financial information must be marked as follows:

> "May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure."

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

The above referenced markings enable DOE to follow the provisions of 10 CFR 1004.11(d) in the event a Freedom of Information Act (FOIA) request is received for information submitted with a proposal. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under a FOIA request or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

Subject to the specific FOIA exemptions identified in 5 U.S.C. 552(b), all information submitted to OTT by an applicant is subject to public release under the

Freedom of Information Act, 5 U.S.C. §552, as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. It is the proposer's responsibility to review FOIA and its exemptions to understand:

1. What information may be subject to public disclosure; and
2. What information applicants submit to the Government that is protected by law.

In some cases, DOE may be unable to make an independent determination regarding which information submitted by a proposer is releasable and which is protected by an exemption. In such cases, DOE will consult with the proposer, in accordance with 10 C.F.R. §1004.11, to solicit the proposer's views on how the information should be treated.

Appendix A: Eligible DOE Program/Technology Areas

OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY (OE)
The Office of Electricity Delivery and Energy Reliability (OE) leads the U.S. Department of Energy (DOE)'s efforts to strengthen, transform, and improve energy delivery infrastructure so that consumers have access to all types of reliable and secure sources of energy. OE does not fund the efforts related to the development of these energy sources. OE works with private industry and Federal, state, local, and tribal governments on a variety of initiatives to modernize the electric grid and enhance key characteristics of the U.S. electric transmission and distribution systems:

- Reliability—consistent and dependable delivery of high quality power.
- Flexibility—the ability to accommodate changing supply and demand patterns and new technologies.
- Efficiency—low losses in electricity delivery and more optimal use of system assets.
- Resiliency—the ability to withstand and quickly recover from disruptions and maintain critical function.
- Affordability—more optimal deployment of assets to meet system needs and minimize costs.
- Security—the ability to protect system assets and critical functions from unauthorized and undesirable actors.

The following OE Technology Areas are eligible to receive TCF funding in FY 2018:

1. Transmission Reliability (OE-TR). Formerly Clean Energy Transmission and Reliability, Transmission Reliability provides the electric sector with the necessary tools and analyses to assess risks, inform decisions, and improve power system planning and performance including mitigating the risks of large-scale blackouts. TR is focused on ensuring the reliability and resiliency of the U.S. electric grid through research and development (R&D) concentrated on measurement and control of the electricity system and risk assessment to address challenges across integrated energy systems. TR's mission manifests itself in several key areas:

a) Advancing electrical engineering through activities in measurements, models, mathematics, and computation
b) Advancing applied mathematics by developing and demonstrating tools intended to enable the electricity system operators and planners to improve reliability, resiliency, and security of the system
c) Advancing risk-based quantification to improve methods and models used to study power system resiliency

2. Resilient Distribution Systems (OE-RDS). Formerly Smart Grid Research and Development, Resilient Distribution Systems focuses on addressing the challenges facing the electric power grid by developing integrated distribution control architectures to provide resilient grid services through management of all assets across the distribution power system. RDS pursues efforts to improve reliability, resiliency, faster outage recovery, and operational efficiency, building upon previous and ongoing grid modernization efforts.

3. Energy Storage (OE-ES). Grid scale Energy Storage supports a more resilient, secure, reliable, and economically competitive U.S. energy infrastructure. Energy storage is emerging as an integral component to the grid modernization to provide a diverse range of services including energy management, backup power, load leveling, frequency regulation, voltage support, and grid stabilization. Primarily, the Energy Storage program focuses on accelerating the development of new materials and device technologies that can lead to significant improvements in the cost and performance of grid scale energy storage systems and accelerated adoption of the energy storage solutions.

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY (EERE)

The mission of EERE is to create and sustain American leadership in the transition to a global clean energy economy. Its vision is a strong and prosperous America powered by clean, affordable, and secure energy. The following EERE Program Offices and related Technology Areas are eligible to receive TCF funding in the FY 2018:

1. Advanced Manufacturing (EE-AMO)

Advanced Manufacturing (AMO) supports activities for manufacturing process, information, and materials technologies essential to the efficient and competitive domestic manufacturing of energy products and to support energy productivity across the entire U.S. manufacturing sector. While AMO's mission encompasses a broad range of novel manufacturing and material technologies, it focuses research and development (R&D) efforts on crosscutting, platform technologies relevant to manufacturing in multiple energy fields, and lowers scientific uncertainty that would otherwise limit the subsequent demonstration, adoption and use of the new knowledge gained through R&D; thus ensuring that new energy technologies invented in the United States ultimately result in the domestic manufacture of energy products. Specific areas of interest include:

- Chemical process intensification to reduce the size and energy intensity of manufacturing processes through higher reaction selectivity and efficiency, new chemistries, novel mixing and separations, and improved heat and mass transfer.
- Advanced materials broadly applicable to energy products, including energy conversion materials, materials for extreme or harsh conditions, and nanomaterials needing innovative approaches to processing.
- Roll-to-roll processes with potential to form complex two-dimensional multi-material assemblies, and functional structures, including batteries, membranes and fuel cells.

2. Bioenergy Technologies (EE-BETO)

Bioenergy Technologies (BTO) focuses on R&D to strengthen the body of knowledge enabling industry to demonstrate and deploy sustainable bioenergy technologies capable of producing price-competitive biofuels from non-food sources of biomass such as wastes and agricultural residues, and from energy crops like switchgrass, and algae. The primary focus is to produce "drop-in" biofuels that are compatible with existing fueling infrastructure and vehicles across a range of transportation modes, including renewable-gasoline, -diesel, and -jet fuels. The Office also supports early stage R&D on converting biomass into high-value chemicals and products that can enhance the economics of biofuel production and improve energy security by displacing demand for oil imports and supplementing domestic oil.

For the FY2018 Technology Commercialization Fund (TCF) call, BETO seeks proposals in the following mission areas:

- Technologies (physical, chemical, biological, including any combination thereof) that can decouple algae production from concentrated CO2 sources

and can integrate into algae cultivation processes. This mission area seeks to complement the research in the Advanced Algal Systems program which focuses on increasing the productivity of algae through the use of advanced biological tools to develop enhanced strains and cultivation practices.

- High-moisture pelleting and low- temperature drying. This mission area seeks to further develop advances made in the Feedstock Supply and Logistics program that contribute to the delivery of feedstocks that meet the quality, quantity, and cost targets of biorefineries.

- Hydrothermal liquefaction of wet sludge. This aligns with BETO's continued focus to accelerate the economic and innovative conversion of wet waste feedstocks, including biosolids which are a significant environmental issue in many areas, to biofuels and bioproducts.

- Performance-advantaged biobased products and functional replacements. This mission area seeks to further development of technologies that utilize the inherent functionality of biomass feedstocks that have novel properties for use in the bioproducts area. This is an area of increasing focus, as described both in budget requests, and also from stakeholder feedback from public workshops.

- Technologies born from the R&D conducted by any of these BETO-funded, DOE National Laboratory-led consortia:
    - Agile BioFoundry (ABF)
    - Chemical Catalysis for Bioenergy (ChemCatBio)
    - Separations for bioenergy (BioESep)
    - Feedstock-Conversion Interface Consortium (FCIC)
    - Co-Optimization of Fuels and Engines (Co-Optima)

- Open Topic. BETO encourages DOE Facilities to submit TCF proposals for any BETO-funded work that has commercial relevance, has an interested partner willing to provide cost-share to develop its technology, and furthers BETO's goals.

3. Building Technologies (EE-BTO)

Building Technologies (BETO) supports R&D of innovative building energy technologies such as lighting, space conditioning and refrigeration, windows and envelope and their effective integration into efficient, resilient, grid connected, and secure building systems. The ultimate goal is to reduce the average energy use per square foot of all U.S. buildings by 50% from 2010 levels and overcome the high degree of fragmentation across the heterogeneous buildings industry spanning construction to appliance and equipment manufacturing.

The following areas will participate in the FY2018 TCF:

- Solid-State Lighting. Solid-State Lighting continues to drive innovations in LED and OLED core technologies (i.e., down converters, stable while OLEDs), product development (i.e., LED package development, low-cost

OLED electrodes), and manufacturing (i.e., LED test equipment, OLED materials manufacturing).

- Heating, Ventilation, and Air Conditioning (HVAC), Water Heating, and Appliances. The focus is on the introduction of new heat pumping technologies, new ways of moving heat around. This includes pursuing both vapor compression and non-vapor compression technologies including several crosscutting technologies research areas: heat exchanger research, compressor research, refrigerant research (Low-GWP solutions), motors, integrated energy storage, and materials joining technologies. R&D priorities include developing integrated systems that combine end uses and exploring new or different next-generation components to find the best possible cost-effective combination, separate sensible and latent cooling AC system (SSLC) offering significant increases in the overall performance of cooling/dehumidification systems compared to conventional vapor-compression air-conditioning systems, and non-vapor compression technologies (no refrigerants, saving energy while reducing environment burdens).

- Sensors & Controls. Sensors and Controls supports the design, research, and development of low-cost and fully automated building sensors and controls systems that will improve date collection, monitoring, and optimization of building energy use. This includes multifunction plug-and-play wireless sensor networks, occupant-centric sensors and controls, granular equipment-level sub-metering, and adaptive and autonomous controls. In addition to ensuring anticipated energy savings through building automation are realized, the subprogram seeks to facilitate effective integration with the evolving electric grid, reduced electricity costs for building owners and tenants, and improved comfort for occupants.

- Transactive Controls. In coordination with the DOE Grid Modernization Initiative, Transactive Controls supports R&D in the development of advanced Transactive Energy applications and load control strategies for building level components and equipment to provide improved efficiency of the integrated electric energy system or extend the service life of utility and building assets. It also includes developing whole-building supervisory load control and fault detection and diagnostics algorithms for improving the energy efficiency, reducing peak demand, and enabling grid responsive loads.

- Windows and Building Envelope. Windows and Building Envelope seeks to develop and accelerate next-generation, energy-efficient windows and building envelope technologies that reduce the amount of energy lost through the building envelope, contribute to improved occupant comfort, and have low product and installation costs. Window R&D efforts are focused on technologies and systems that dramatically reduce thermal losses and gains, actively modulate and control solar load to minimize summer cooling and offset winter heating, maximize effective use of daylight to offset electric lighting, and provide outside ventilation air displacing mechanical ventilation whenever possible. Building envelope R&D efforts are concentrated on cost-

effective technologies that include insulation materials for retrofitting walls and commercial building roofing systems, air-sealing technologies that simultaneously prevent the uncontrolled flow of heat, air, and moisture, and diagnostic tools for state and extent estimation.

- Building Energy Modeling. Building Energy Modeling conducts building-physics and HVAC system integration research and embodies it in open-source BEM software packages, including the EnergyPlus and Spawn-of-EnergyPlus whole-building energy modeling engines, the Radiance lighting engine, the THERM 2D/3D assembly heat transfer engine, and the OpenStudio integration and automation platform. R&D efforts include algorithms and frameworks to support new BEM applications in areas such as urban and district-scale modeling, building operations including commissioning and control, and use of new data sources and streams to refine energy models.

4. Fuel Cell Technologies (EE-FCTO)

Fuel Cell Technologies (FCTO) addresses key technical challenges for both fuel cells and hydrogen fuels (i.e., hydrogen production, delivery and storage). Light duty vehicles are an emerging application for fuel cells that has earned substantial commercial and government interest worldwide due to the superior efficiencies, reductions in petroleum consumption, and reductions in criteria pollutants possible with fuel cells. Fuel cell electric vehicles (FCEVs) reduce petroleum consumption by about 95% in comparison to conventional light duty vehicles when the hydrogen is produced from natural gas.[e] The areas identified in this Lab Call will enable progress toward commercializing light duty FCEVs. Recent analyses project that, if DOE cost targets for FCEVs are met, U.S. petroleum consumption can be reduced by over one million barrels per day.[f]

The following FCT areas will participate in the FY2018 TCF Lab Call:

- Hydrogen Delivery program provides the industrial gas sector with technologies to reduce the costs of cross-country gas transport, along with the costs and reliability of hydrogen dispensing into niche applications, such as hydrogen fueling stations for fuel cell vehicles. R&D areas of interest within this segment include:
    - Lowering the energy consumption and enhancing the scalability of hydrogen gas liquefaction on alternatives to conventional mechanical cycles, such as discovery and use of magnetocaloric materials.
    - Enhancing reliability and lowering costs of hydrogen fueling station components on pressure vessel materials and designs, non-mechanical approaches to compression, and development of high-strength polymers and high-accuracy meters (<1.5%) for hydrogen dispensers.

[e] https://www.hydrogen.energy.gov/pdfs/16004_life-cycle_ghg_oil_use_cars.pdf
[f] https://www.hydrogen.energy.gov/pdfs/16003_ghg_emissions_oil_use_reduction_from_fc.pdf

- Lowering the costs of high-pressure hydrogen pipelines through R&D in areas such as microstructural engineering of novel materials, and mechanical evaluations of fiber reinforced polymer.
- Development of components for high-throughput hydrogen compressors through R&D on high-strength materials and component designs, to reliably enable enhancements in hydrogen pipeline capacities.

- Safety, Codes and Standards (SCS) supports R&D that provide experimentally validated foundational understanding of the relevant physics, critical data, and safety information needed to define requirements for technically sound and defensible codes and standards. In addition, SCS aims to enable the safe deployment of hydrogen and fuel cell technologies, based on sound and traceable technical and scientific data and analysis. R&D areas of interest within Safety, Codes and Standards include enhancing the reliability and lowering the cost of hydrogen sensing technologies—such as safety sensors, contaminant detectors and metrology devices for use in hydrogen fueling stations, as well as for other related applications.

5. Geothermal Technologies (EE-GTO)

Geothermal Technologies (GTO) supports the effort to commercialize lab developed technologies which can accelerate the deployment of geothermal energy. As part of the FY 2018 Technology Commercialization Fund, GTO seeks to fund projects that align with one or more of the following:

- Enhanced Geothermal Systems (EGS) is focused on technologies that enable the creation of an engineered geothermal reservoir where there is hot rock but little to no natural permeability or fluid saturation present in the subsurface. Activities of interest include facilitating characterization of local stress, stimulation technologies that improve permeability, and fluid and thermal pathways evolution through space and over time; allowing for economic access to the subsurface thermal resource, while ensuring wellbore integrity over multi-decadal timeframes; and enabling sustainable operation, which involves achieving sufficient productivity for power generation without excessive pressure build up or localization and decrease of flow.

- Hydrothermal seeks to find new and innovative approaches to exploration that facilitate finding and accessing not yet discovered or “blind” hydrothermal systems. These approaches can include advanced methods to combine various data sets (such as gravity, seismic, and magnetelluric data, among others) to that reduce upfront exploration risk; improvements to drilling technologies that will reduce the cost of accessing the subsurface through abrasive, crystalline rock formations at elevated temperatures and pressures; new technologies that reduce costs for exploration activities such as microhole drilling applications, self-healing cements, subsurface imaging; alternatives to hydraulic fracturing that reduce, or eliminate, the use of water for fracturing and stimulation activities; or other activities that support any of the four subsurface R&D pillars of wellbore integrity, subsurface stress and induced seismicity, permeability manipulation, and new subsurface signals.

- Low Temperature and Coproduced Resources supports the development of geothermal resources below a temperature of 300°F (150°C) as well as geothermal resources that can be co-developed with existing well-field infrastructure and other clean energy technologies. Activities of interest including thermal desalination processes, mineral recovery from geothermal brines, hybrid systems that pair geothermal with other energy technologies, and direct use of thermal resources for process and space heating applications (including ground source heat pumps). Also of interest are technologies that enable geothermal resources to provide energy storage, flexible generation, and other grid services.

- GTO also supports the development of general tools that identify and address barriers to geothermal adoption in the United States.

6. Solar Energy Technologies (EE-SETO)

Solar Energy Technologies (SETO) supports research and development to improve the flexibility and performance of solar technologies that contribute to a reliable and resilient U.S. electric grid. The office invests in innovative research efforts that securely integrate more solar energy into the grid, enhance the use and storage of solar energy, and lower solar electricity costs. The following areas will participate in the FY2018 TCF Lab Call:

- Photovoltaics. Supports research and development (R&D) projects that lower manufacturing costs, increase efficiency and performance, and improve reliability of PV technologies, in order to support the widespread deployment of electricity produced directly from sunlight ("photovoltaics"). Notable PV technology areas of interest include:
    - Crystalline Silicon
    - Cadmium Telluride (CdTe)
    - Copper Indium Gallium Diselenide (CIGS)
    - Earth-Abundant Materials
    - Hybrid Organic-Inorganic Halide Perovskite
    - Multijunction (III-V)
    - Organic

- Concentrating Solar Power (CSP). Supports the development of novel CSP technologies that will lower cost, increase efficiency, and improve reliability compared to current state-of-the-art technologies. These projects explore new concepts in operation system designs and innovative concepts in the collector, receiver, thermal storage, heat transfer fluids, and power cycle subsystems, advancing the state-of-the-art. There is significant interest in transformative concepts with the potential to break through existing performance barriers, such as efficiency and temperature limitations.

  The National Renewable Energy Laboratory developed the Concentrating Solar Power Gen3 Demonstration Roadmap to address and prioritize research and development gaps for CSP technology. Learn more.

- Systems Integration. Seeks to enable the widespread deployment of secure, reliable, and cost effective solar energy on the nation's electricity grid by addressing the associated technical and organizational challenges. To

proactively anticipate and address potential challenges under a scenario in which hundreds of gigawatts (GW) of solar energy are interconnected to the electricity grid, research that addresses these challenges in four broad, inter-related areas:

  - Grid Performance and Reliability: Enhance the efficiency and reliability of electric transmission and distribution systems in a cost-effective, secure, and reliable manner.
  - Dispatchability: Ensure that solar power is available on-demand, when and where it is needed and at the desired amounts, in a manner that is comparable to or better than conventional power plants.
  - Power Electronics: Use devices to maximize the power output from solar power plants and interface with the electric grid (or end use circuits), while ensuring overall system performance, safety, reliability, and controllability at minimum cost.
  - Communications: Develop innovative infrastructure to inform as well as monitor and control generation, transmission, distribution, and consumption of solar energy effectively under broad temporal and spatial scales.

- Balance of System. Works to address challenges associated with non-hardware costs of solar and remove market barriers to the adoption of solar energy technologies throughout the United States. In support of the SunShot Initiative goals, the soft costs program works in the following strategic areas: networking and technical assistance, data analysis, business innovation, and training.

7. Vehicle Technologies (EE-VTO)

Vehicle Technologies (VTO) supports a broad portfolio of research to develop and deploy innovative energy technologies for the efficient and secure transportation of people and goods across America. Research and development efforts are focused on reducing the cost and improving the performance of a mix of near- and long-term vehicle technologies such as electrification, including advanced battery technologies; advanced combustion engines and fuels, including co-optimized systems; advanced materials for lighter-weight vehicle structures and better powertrains; and energy efficient mobility technologies and systems, including connected and autonomous vehicles as well as innovations in connected infrastructure for significant energy efficiency improvement.

The following areas will participate in the FY2018 TCF Lab Call:

- Batteries and Electrification Technologies aims to develop new battery chemistry and cell technologies that can reduce the cost of electric vehicle batteries to less than $100/kWh—ultimately $80/kWh, increase range of electric vehicles to 300 miles, and decrease charge time to 15 minutes or less. Major areas of research in batteries include:

  - Exploratory Battery Materials Research: Addresses fundamental issues of materials and electrochemical interactions associated with lithium and beyond-lithium batteries. This research attempts to develop new and promising materials, use advanced material models

to predict the modes in which batteries fail, and employ scientific diagnostic tools and techniques to gain insight into why materials and systems fail.
    - Applied Battery Research: Focuses on optimizing next generation, high-energy lithium ion electrochemistries that incorporate new battery materials. The activity emphasizes battery system development and electrochemical diagnostics, battery testing and electrolyte development, spectroscopy and microscopy diagnostics, and abuse evaluation, accelerated-life test procedures and statistical analysis.
    - Advanced Battery Development, System Analysis, and Testing: Focuses on the development of robust battery cells and modules to significantly reduce battery cost, increase life, and improve performance.

- Advanced Combustion and Fuels supports efforts to improve understanding of, and ability to manipulate, combustion processes, generating knowledge and insight necessary for industry to develop the next generation of engines and fuels. Approached as a system, fuels, engines, and emission control (exhaust aftertreatment) can be optimized together using a science-based understanding to increase efficiency and vehicle fuel economy. The program pursues areas of research that include:

    - Research on advanced combustion strategies such as low temperature combustion, dilute gasoline combustion, and clean diesel combustion with potential for high efficiency and very low engine-out emissions. Experimental combustion research to establish quantitative relationships between in-cylinder processes (fuel injection, air mixing, and combustion), emissions formation, and efficiency improvement potential. Predictive high fidelity models are developed to simulate the fundamental physics of combustion phenomena to achieve results comparable to detailed experiments. Numerical routines are developed for models that can reduce the computational time to enable high fidelity engine models as viable engine design tools for industry.
    - Research of fuel properties to determine fuel characteristics that enable higher efficiency advanced combustion approaches such as spark and multi-mode spark ignition/compression ignition regimes. Performance tailored blendstocks, including bio-derived, synthetic and petroleum-based blend stocks could further increase engine efficiency as well. Co-optimization of fuels and engines will focus on advanced conventional and kinetically controlled engine technologies with advanced fuels that enable maximum engine performance.
    - Emission control research will focus on catalysts that are active at the lower exhaust temperatures, namely those that provide greater than 90% emission reduction efficiency at about 150oC, addressing barriers such as catalyst activity, selectivity, durability, and cost effectiveness.

- Materials Technology program enables increased fuel efficiency through lightweight materials for automotive structures and powertrains including advanced materials for high-efficiency engines. Research is focused in two areas:

    - Improved properties, manufacturability, computational materials science, and enabling technologies, such as joining of dissimilar materials, for carbon fiber composites, advanced high-strength steels, aluminum alloys, and magnesium alloys.
    - Powertrain-specific technology gaps, such as improved materials properties under high temperature and pressure, to enable out-year powertrain materials requirements.

- Energy Efficient Mobility Systems program aims to identify and support technologies and innovations that encourage a maximum-mobility, minimum-energy future in which transportation systems may be automated, connected, electric, and/or shared. Research is focused on the development of future mobility technology solutions that lead to energy efficiency benefits, including hardware devices, software solutions, control systems, advanced sensors, and other components that reduce transportation system energy use while enhancing mobility for individuals and businesses.

8. Water Power Technologies (EE-WPTO)

Water Power Technologies (WPTO), which include hydropower and marine and hydrokinetic (MHK) energy, generate renewable electricity that supports domestic economic growth and energy security while supporting the reliability of the U.S. power grid.

- Hydropower Technologies. Hydropower is the oldest and largest installed renewable energy resource in the United States. While hydroelectricity has been in use for over a century, there is still opportunity for additional generating capacity and grid reliability services realized through novel design and operations innovations. The 2016 DOE *Hydropower Vision* report, identified a number of credible scenarios where industry could realize up to 50 GW of new hydropower capacity from upgrading and modernizing the existing fleet, installing generation on non-powered dams, and developing new small hydropower and pumped storage technologies.

- Marine and Hydrokinetic Technologies. Marine and hydrokinetic (MHK) technologies convert the energy of waves, tides, and river and ocean currents into electricity. National resource assessments have found that the United States has 1,250–1,850 terawatt-hours per year (TWh/yr) of untapped, technically extractable MHK resource potential1, equivalent to nearly 30% of total electricity generation in the United States. MHK is a predictable, forecastable resource with generation patterns typically complimentary to other renewable resources such as onshore wind and solar, enhancing its potential to enhance grid stability. Industry deployment of MHK technologies for bulk power generation is nascent, and far from cost-competitiveness at the utility scale for MHK technologies. However, niche applications such as serving remote coastal communities with high electricity

costs, charging for ocean-based sensors and underwater vehicles, and non-electric uses like desalination could provide industry with opportunities to develop and deploy MHK technologies in the near-term.

9. Wind Energy Technologies (EE-WETO)

The following Wind Energy Technologies (WETO) areas will participate in the FY2018 TCF Lab Call:

Wind Technology Research, Development and Testing and Resource Characterization (RD&T and RC) aims to reduce the levelized cost of energy (LCOE) for U.S. land-based, offshore, and distributed wind systems to complement traditional electricity sources for the nation. Optimize the cost and performance of the wind plant as an integrated system rather than focusing on the component or turbine level. To address key cost drivers—capital costs, O&M costs, annual energy production (AEP), and financing rates—and improve the performance and reliability of the wind plant overall, Wind Tech RD&T and RC invests in a range of parallel and complementary research and development (R&D) activities to inform wind turbine technology innovations—including those that enable higher hub heights, larger rotors, and improved wind plant energy capture—to provide the opportunity for significant growth in U.S. wind power and U.S. industry competitiveness.

OFFICE OF FOSSIL ENERGY (FE)

The Office of Fossil Energy Research and Development (FER&D) advances transformative and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy sources constitute over 80% of the country's total energy use, and are important to the nation's security, economic prosperity, and growth. These efforts encompass the development of advanced energy systems, crosscutting fossil energy research, advanced Carbon Capture Utilization and Storage (CCUS) technologies. Additionally, FER&D conducts research related to the prudent and sustainable development of domestic oil and gas resources, with a focus on natural gas technologies and unconventional resources.

The following FER&D areas will participate in the FY2018 TCF Lab Call:

1. **Advanced Energy Systems (FE-AES)** includes new technology applications (i.e., pulse combustion, flameless combustion, toping cycles) at both new and existing plants. Also included is research on advanced turbines that can withstand new stresses placed on the sector by the need for demand-response performance, and on materials for solid oxide fuel cells and advanced modular gasification systems.

2. **Cross-cutting Research (FE-CCR)** includes work in advanced materials, computational science, and advanced analytical tools, with particular attention to high pressure/high temperature applications. R&D consists of low-cost and reliable multi-sensing sensors capable of detecting temperature, gas species and pressure that—with additional development and scale-up by industry—could ultimately be capable of providing real-time measurements critical to the operation, optimization, reliability and efficiency of the next-generation of fossil fueled power systems. Crosscutting Materials focuses on efforts to use computational tools to discover and design novel materials for fossil fuel applications.

3. **Carbon Capture Utilization (FE-CCU)** includes transformational carbon capture technologies such as, but not limited to, non-aqueous solvents, advanced membranes and metal organic frameworks (MOFs) that can significantly reduce the cost of capture from fossil fuel-fired power plants and industrial facilities. Transformational capture systems are considered to be a set of disruptive technologies that can significantly reduce the cost of capture. In addition to post-combustion capture, it also supports pre-combustion R&D that focuses on CO_2 separation from syngas. Applications are sought that develop transformational materials and integrated processes of multiple novel technologies to reduce the cost of capture from coal fired power plants and industrial sources such that the cost of capture and compression to supercritical conditions is below $30/tonne. Applications that test on natural gas flue gas must describe how the technology supports the development of the same technology for the coal industry. Technology development for industrial sectors not related to the fossil fuel industry will not be considered.

4. **Carbon Storage (FE-CS)** includes the development of technologies that ensure safe, secure, efficient and cost-effective CO_2 injection and containment in storage complexes in diverse geologic settings. Additionally, there is a focus on assessing offshore storage potential in oil and natural gas reservoirs and saline formations. It supports research on the utilization and conversion of CO_2 to valuable products. Applications are sought to develop new or advance existing tools, techniques, and procedures for both on- and offshore that improve wellbore materials and integrity sensing and monitoring, increase reservoir storage efficiency, improve management of reservoir pressure, confirm permanent storage, and identify and mitigate the risk or onset of potential environmental impacts such as leakage or induced seismicity. Of particular interest are technologies that can improve performance, lower cost and uncertainty, and risk in the context of an integrated storage complex management system. Applications are also sought to develop non-biological CO_2 conversion approaches that create new carbon-carbon bonds or that otherwise increase the complexity of recipient molecular structures, without proceeding through a syngas intermediate. Of further interest are such approaches that do not require the input of hydrogen. General electro-chemical and electro-biochemical pathways that have a theoretical potential to attain and sustain current densities on the order of 1000 mA/cm2 and 100 mA/cm2 of electrode surface, respectively, are also encouraged.

5. **Natural Gas Technologies (FE-NGT)** includes the development of advanced pipeline and Natural Gas infrastructure technologies to aid in cleaner and more effective oil and gas development. R&D of technologies in targeted areas such as advanced materials and coatings, and sensor research and development will improve the operational efficiency of natural gas transmission, distribution, and storage facilities. Additional efforts will support the research and development of natural gas conversion technologies.

6. **Unconventional Fossil Energy Technologies from Petroleum – Oil Technologies (FE-UFET)** investigates technical subsurface dynamics that can contribute to game-changing increases in recovery factor from the typical single-digit range. Research areas of interest focus on: increasing ultimate recovery including new technologies and/or approaches that can enable or accelerate dramatic improvements in drainage volume, and per well resource recovery efficiency; measurements and prediction of seismic events, and/or changes in subsurface stress associated with reservoir stimulation and/or injection and production activities within formations that will provide scientific insights into the relationships, if any, between operational activities and induced seismicity; and, new, integrated, and cost effective treatment options for multiple contaminants and recovery of value-added products from produced water from multiple plays and regions.

OFFICE OF NUCLEAR ENERGY

The Department of Energy's (DOE) Office of Nuclear Energy (NE) conducts crosscutting nuclear energy research and development (R&D) and associated infrastructure support activities to develop innovative technologies that offer the promise of dramatically improved performance for advanced reactors and fuel cycle concepts while maximizing the impact of DOE resources. The following NE areas will participate in the FY2018 TCF Lab Call:

1. Fuel Cycle Research and Development (NE-FCRD). FC R&D is to develop used nuclear fuel management strategies and technologies to support meeting the Federal government responsibility to manage and dispose of the Nation's commercial used nuclear fuel and high-level waste and to develop sustainable fuel cycle technologies and options that improve resource utilization and energy generation, reduce waste generation, enhance safety, and limit proliferation risk. The vision is that by mid-century, strategies and technologies for the safe, long-term management and eventual disposal of U.S. commercial used nuclear fuel and any associated nuclear wastes are fully implemented. Additionally, it is desired that advanced nuclear fuel and fuel cycle technologies that enhance the accident tolerance of light-water reactors and enable sustainable fuel cycles are demonstrated and deployed. Together, these technologies and solutions support the enhanced availability, affordability, safety, and security of nuclear-generated electricity in the United States. Current challenges include the development of high burn-up fuel and cladding materials to withstand irradiation for longer periods of time with improved accident tolerance; development of simplified materials recovery technologies, waste management (including storage, transportation, and disposal), and proliferation risk reduction methods; and development of processes and tools to evaluate sustainable fuel cycle system options, and to effectively communicate the evaluation results to stakeholders.

2. Reactor Concepts Research, Development, and Demonstration (NE-RCRDD). RCRDD's mission is to develop new and advanced reactor designs and technologies that broaden the applicability, improve the competitiveness, and ensure the lasting contribution toward meeting our Nation's energy and environmental challenges. Research activities are designed to address the technical, cost, safety, and security issues associated with various reactor concepts. The four technical areas are Light Water Reactor Sustainability (LWRS), Small Modular Reactors (SMRs), Advanced (Non-Light Water) Reactor Concepts, and Advanced SMRs.

3. Nuclear Energy Advanced Modeling and Simulation (NE-NEAMS). NEAMS is to develop and deploy the NEAMS ToolKit, comprised of advanced computational tools, for use by government, industry, and academia in nuclear R&D, design, and analysis. These advanced computational tools employ scalable simulation methods on high performance computing architectures in combination with a science-based, mechanistic approach to physics modeling to allow scientists and engineers to better understand reactor materials properties and coupled phenomena in nuclear energy systems. The NEAMS ToolKit spans length scales from atomic to mesoscale to continuum, and time scales from picoseconds to seconds to days. NEAMS tools are currently being used to help evaluate advanced nuclear fuels and reactor concepts, design and analyze nuclear fuel experiments, and explore potential breakthroughs in the use of transient test reactors.

4. Nuclear Energy Enabling Technologies (NEET) Crosscutting Technology Development (CTD) (NE-NEETCTD). NEET CTD conducts R&D in crosscutting technologies that directly support and enable the development of new and advanced reactor designs and fuel cycle technologies. These technologies will advance the state of nuclear technology, improve its competitiveness and promote continued contribution to meeting our Nation's energy and environmental challenges. The activities undertaken in this program complement those within the RC RD&D and FC R&D programs. The knowledge generated through these activities will allow NE to address key challenges affecting nuclear reactor and fuel cycle deployment with a focus on crosscutting innovative technologies.

Appendix B: TCF Match and Non-Federal Match Information

Matching

The terms “matching” and “cost sharing” are often used synonymously and can create confusion. OTT uses the terms “matching” and “non-Federal match” to ensure consistency with Section 1001 of EPAct 2005, which authorized the establishment of the Technology Commercialization Fund (TCF). For the TCF, “match” or “matching funds” means that for each dollar of TCF funding provided, a dollar of non-Federal funds is required. Because there is a one-for-one match required for TCF funds, the TCF will never contribute more than 50% of the total cost of any project. It is possible for the non-Federal match to exceed the funding contributed by the TCF, if the DOE site or private partner wishes to provide more than 50% of the total project cost.

What Qualifies for Non-Federal Matching

It is not possible to explain what specifically qualifies for the non-Federal match in one or even a couple of sentences. Please consult the Federal Acquisition Regulations (FAR) or the rules for Federal Financial Assistance at 2 CFR 200 for information about which costs are allowable. In addition, matching non-Federal costs may not be counted if they are paid by the Federal Government under another award.
In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted.

Additionally, DOE generally does not allow pre-award costs for either Federal cost match or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, DOE generally does not allow pre-award costs prior to the signing of the Selection Statement by the DOE Selection Official.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules about what is allowable are generally the same within like-types of organizations. The following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

A. Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's non-Federal match if such contributions meet all of the following criteria:
    1. They are verifiable from the recipient's records.
    2. They are not included as contributions for any other Federally-assisted project or program.
    3. They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
    4. They are allowable under the cost principles applicable to the type of entity incurring the cost.

5. They are not paid by the Federal Government under another award unless authorized by Federal statute.
6. They are provided for in the approved budget.

B. Valuing and documenting contributions.
   1. Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as non-Federal matching funds, that full value must be the lesser or the following:
      a) The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
      b) The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.
   2. Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.
   3. Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as non-Federal matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.
   4. Valuing property donated by third parties.
      a) Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the non-Federal match share must be reasonable and must not exceed the fair market value of the property at the time of the donation.
      b) Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets

may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
ii. The value of loaned equipment must not exceed its fair rental value.

5. Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

a) Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.
b) The basis for determining the valuation for personal services and property must be documented.

Appendix C: TCF Final Report Template

Final TCF Report for
Click here to enter project title.

Click here to enter TCF tracking Number (TCF-1X-XXXXX).

Click here to enter name(s) of author(s).

Click here to enter month and year (of final report).

Prepared for the
U.S. Department of Energy
Office of Technology Transitions

Note: This template is current as of December 2017.
Please contact OTT (TCF@hq.doe.gov) for an updated version before beginning a final report.

Click here to enter Project Title

PROJECT INFORMATION

TCF Tracking Number: Click here to enter TCF Tracking Number (TCF-1X-XXXX).

Start Date: Click here to enter a date. Completion Date: Click here to enter a date.

Point(s) of Contact at DOE Facility: Click here to enter name(s) of POC(s) at DOE Facility

Partner(s) and Point(s) of Contact (if applicable): Click here to enter name(s) of partner organization(s) and POC(s) there, if applicable.

Type of partnership agreement used (if applicable) (e.g., CRADA, ACT, contract): Click here to enter type of partnership agreement used (if applicable).

Funding Table

	TCF Funding		Matching Funding	
Year	Planned	Actual	Planned	Actual
1	$XXX,XXX	$XXX,XXX	$XXX,XXX	$XXX,XXX
2 (if applicable)	$XXX,XXX	$XXX,XXX	$XXX,XXX	$XXX,XXX
Total	**$XXX,XXX**	**$XXX,XXX**	**$XXX,XXX**	**$XXX,XXX**

Source of TCF funding
Check box(es) to indicate which DOE Program Office(s) funded your project

Office of Electricity and Energy Reliability (OE)

- ☐ Clean Energy Transmission and Reliability (FY16; FY17)
- ☐ Cybersecurity for Energy Delivery Systems (FY17)
- ☐ Energy Storage (FY16; FY17)
- ☐ Energy Storage (Grid Scale) (FY18)
- ☐ Resilient Distribution Systems (FY18)
- ☐ Smart Grid Research and Development (FY16; FY17))
- ☐ Transmission Reliability (FY18)

Office of Energy Efficiency and Renewable Energy (EE)

- ☐ Advanced Manufacturing (FY16; FY17; FY18)
- ☐ Bioenergy Technologies (FY16; FY17; FY18)
- ☐ Building Technologies (FY16; FY17; FY18)
- ☐ Fuel Cell Technologies (FY16; FY17; FY18)
- ☐ Geothermal Technologies (FY16; FY17; FY18)
- ☐ Solar Energy Technologies (FY16; FY17; FY18)
- ☐ Vehicle Technologies (FY16; FY17; FY18)
- ☐ Water Power Technologies (FY16; FY17; FY18)
- ☐ Wind Energy Technologies (FY16; FY17; FY18)

Office of Fossil Energy (FE)

- ☐ Advanced Energy Systems (FY16; FY17; FY18)
- ☐ Carbon Capture (FY16; FY17; FY18)
- ☐ Carbon Capture and Utilization (FY18)
- ☐ Carbon Storage (FY16; FY17; FY18)
- ☐ Coal R&D (FY16; FY17)
- ☐ Cross-cutting Research (FY16; FY17; FY18)
- ☐ Natural Gas Technologies (FY16; FY17; FY18)
- ☐ Supercritical Transformation Electric Power (STEP) R&D (FY16; FY17)
- ☐ Unconventional Fossil Energy Technologies (FY16; FY17))
- ☐ Unconventional Fossil Energy Technologies from Petroleum – Oil Technologies (FY18)

Office of Nuclear Energy (NE)

- ☐ Fuel Cycle Research and Development (FY16; FY17; FY18)
- ☐ Nuclear Energy Advanced Modeling and Simulation (FY18)
- ☐ Nuclear Energy Enabling Technologies (FY16; FY17)
- ☐ Nuclear Energy Enabling Technologies (NEET) Crosscutting Technology Development (CTD) (FY18)
- ☐ Reactor Concepts R&D (FY16; FY17)
- ☐ Reactor Concepts Research, Development and Demonstrations (FY18)
- ☐ Supercritical Transformation Electric Power (STEP) R&D (FY16; FY17)

Scope and Objective

Click here to enter text describing the project scope and objectives.

PROJECT ACCOMPLISHMENTS

Benefit to DOE

Click here to provide a brief summary of the benefits derived from the project (e.g., new subject inventions, new project partners, additional partner contributions).

Reference Appendix A as needed.

Market Viability

Click here to describe state of market viability at project inception and project completion.

Generated Data and Reports

Click here to list journal articles, reports, etc.

Path Forward

Click here to discuss anticipated next steps toward commercialization (12-18 month horizon).

APPENDIX A: CLOSEOUT CHECKLIST

Yes	No	N/A	**Check the appropriate response) to the following statements:**
☐	☐	☐	All proposed work identified under the project and all outstanding issues have been completed and/or resolved.
☐	☐	☐	Partner(s) (if applicable) has been notified of the completion of the project and established date of completion.
☐	☐	☐	Protected CRADA Information has been stamped, when appropriate, in accordance with the CRADA and DOE Facility policy.
☐	☐	☐	Funding Program Office notified of completion, and established date of completion
☐	☐	☐	Office of Technology Transitions notified of completion, and established date of completion
☐	☐	☐	Remaining funds dispositioned

CONSTRAINTS/EXTERNAL INFLUENCES

If the activity was unsuccessful, select one or more of the following reasons.

☐Technical or manufacturing problems ☐Changes in market conditions

☐Funding Availability ☐Competing Technology

☐Personnel Changes ☐Legislative/Regulatory Impacts

☐Work Scope Changes ☐Changes in Partner Objectives

☐Other (please specify): Click here to enter text.

FOLLOW-ON ACTIVITIES

If applicable, check the box(es) below to identify follow-on activity that resulted from your project. In the adjacent column enter a number to indicate how many of each. (e.g., ☒CRADAs # 2 indicates that your project resulted in two follow-on CRADAs.)

Activity	**Number of instances**	**Activity**	**Number of instances**
☐CRADAs	#Click here to enter #.	☐Licenses	#Click here to enter #.
☐Cost-shared Contracts	#Click here to enter #.	☐Copyrights	#Click here to enter #.
☐Invention Disclosures	#Click here to enter #.	☐Reimbursable SPP	#Click here to enter #.
☐Technical Assistance	#Click here to enter #.	☐Use of Facilities	#Click here to enter #.
☐Patent Applications	#Click here to enter #.		

Did your project receive any awards (e.g., R&D 100)? ☐No ☐Yes

Click here to list awards your project received.

Click here to enter Project Title

Acknowledgements

Signatures below indicates the following:

1. The Partner(s) (if applicable) has reviewed the final report and concurs with the statements made therein.
2. The Partner (if applicable) agrees that any modifications from the initial proposal were discussed and agreed to during the term of the project.
3. The Partner (if applicable) certifies that all reports either complete or in process are listed and all subject inventions and the associated intellectual property protection measures attributable to the project have been disclosed or are included on a list attached to this report.

Click here to enter PI's Name.		Click here to enter today's date
P.I. Name	Signature	Date
Click here to enter TTO's name.		Click here to enter today's date
Facility Tech Transfer Officer	Signature	Date

Appendix D: Technology Transfer Offices and the Points of Contact (POCs) at DOE National Laboratories and Facilities

The Ames Laboratory			
Ames Office of Sponsored Research Administration			
POC:	Lisa Rodgers	rodgers@ameslab.gov	515.294.1048

Argonne National Laboratory			
Argonne Office of Technology Development and Commercialization (TDC)			
POC:	Suresh Sunderrajan	ssunderrajan@anl.gov	630.252.8111

Brookhaven National Laboratory			
Brookhaven Office of Technology Development and Commercialization (TDC)			
POC:	Poornima Upadhya	pupadhya@bnl.gov	631.344.4711

Fermi National Accelerator Laboratory			
Fermi Lab Office of Partnerships and Technology Transfer			
POC:	Cherri Schmidt	cherri@fnal.gov	630.840.5178

Idaho National Laboratory			
Technology Deployment Office			
POC:	Jason Stolworthy	jason.stolworthy@inl.gov	208.526.3437

Lawrence Berkeley National Laboratory			
LBNL Innovation and Partnerships Office (IPO)			
POC:	Elsie Quaite-Randall	equaiterandall@lbl.gov	515.486.7234

Lawrence Livermore National Laboratory			
LLNL Industrial Partnerships Office (IPO)			
POC:	Richard Rankin	rankin8@llnl.gov	925.423.9353

Los Alamos National Laboratory			
LANL Office of Market Transition within the Richard Feynman Center for Innovation			
POC:	David Pesiri	pesiri@lanl.gov	505.665.7279

National Energy Technology Laboratory			
NETL Office of Technology Transfer			
POC:	Jessica Sosenko	jessica.sosenko@netl.doe.gov	412.386.7417

National Renewable Energy Laboratory			
NREL Office of Technology Transfer within the Office of Innovation Partnering and Outreach			
POC:	Kristin Gray	kristin.gray@nrel.gov	303.275.3050

National Security Campus			
POC:	Chris Boucher	cboucher@kcp.com	816.488.4186

Nevada National Security Site			
POC:	Monica Sanchez	monica.sanchez@nnsa.doe.gov	702.295.2309

Oak Ridge National Laboratory			
ORNL Office of Technology Transfer within the Office of Science and Technology Partnerships			
POC:	Mike Paulus	paulusmj@ornl.gov	865.574.1051

Pacific Northwest National Laboratory			
PNNL Office of Technology Commercialization (OTC)			
POC:	Lee Cheatham	lee.cheatham@pnnl.gov	509.375.6597

Pantex Plant			
Pantex Technology Transfer			
POC:	Jeremy Benton	Jeremy.Benton@cns.doe.gov	806.477.5422

Princeton Plasma Physics Laboratory			
PPPL Office of Technology Transfer, Patents and Publications			
POC:	Laurie Bagley	lbagley@pppl.gov	609.243.2425

Sandia National Laboratories			
Sandia Industry Partnerships Office			
POC:	Mary Monson	mamoso@sandia.gov	505.844.3289

Savannah River National Laboratory			
Savannah River Office of Research and Technology Partnerships			
POC:	Chuck Meyers	chuck.meyers@srs.gov	803.725.3020

SLAC National Accelerator Laboratory			
SLAC Office of Intellectual Property and Research Partnerships			
POC:	Mike Willardson	michaelw@slac.stanford.edu	650.926.3580

Thomas Jefferson National Accelerator Facility			
Jefferson Lab Technology Transfer and Invention Review Committee			
POC:	Joseph L. Scarcello	scarcell@jlab.org	757.269.7027
Y-12 National Security Complex			
Y-12 Office of Commercialization and Partnerships			
POC:	Jeremy Benton	jeremy.benton@cns.doe.gov	865.574.5981