

SUBTOPIC	QUESTION	ANSWER(S)
<b>Advanced Manufacturing</b>		
7a	As a small business with new cyber R&D (doing business with DoD), do we have to form our own relationships with manufacturers/control system suppliers, or can DoE help?	These business relationships would be among businesses and DOE would have to remain out of those relationships. If a small business wanted to get into the business of cyber technology for control system security as a result of the SBIR opportunity made available, it would be expected that the small business would set out and establish relationships with other businesses in the industrial control supply chain. DOE would not be favorable to business relationships developed with foreign companies for R&D conducted within the scope of the SBIR project.
7a	For "situational awareness," do you have data suggestions? Can the Phase I POC utilize simulated data?	The POC can use real or simulated data that are reflective of actual industrial control system security issues.
7b	In successful implementations of this solicitation, how scalable have the single molecule membrane/molecular sieve approaches been so far? Can they be stacked?	All the designs we've seen so far are single layer, but they don't have to be. We've seen the possibility of having multiple layers, and we're open to that as long as they are atomically precise.
<b>Bioenergy</b>		
8a	Is a project with an aim to integrate processes (TRL-4/5) responsive to this subtopic?	There are not prescribed TRL restrictions for proposed technologies under this topic, and thus a project aimed at integrating processes (TRL -4/5) could be responsive so long as the overall process uses a cell-free processing step (at least one) to perform a chemical conversion step.
8a	Are there benchmarks for how long enzymes should be stable and type of conditions?	There is not a uniform benchmark for how long enzymes should be stable under certain conditions because appropriate enzyme stability would be a function of the specific system proposed and the specific conditions established to optimize that system. However, proposals should discuss enzyme stability to contextualize its importance as a function of cost and overall system viability.
8b	Is the bio-based precursor's production technology for plastic responsive?	Precursor production technology is responsive as long as the other topic requirements such as end of life considerations and performance-advantaged characteristics for the expected resulting product are addressed.
8b	Are biological polymers other than conventional plastics that use lignocellulosic residue as the raw materials applicable?	Biological polymers are potentially applicable as long as the other topic requirements such as end of life considerations and performance-advantaged characteristics for the expected resulting product are addressed.
8b	Is algae acceptable for 8b Area 1 Plastics Circular Carbon Economy	Algae-derived materials would be acceptable if the other topic requirements such as end of life considerations and performance-advantaged characteristics for the expected resulting product are addressed.

8b	Will bio-based chemicals that serve as replacement of current oil-based plastic precursors be in consideration?	Proposals must include a discussion of how their proposed plastic has superior end of life considerations compared to oil-based plastics. Proposals are encouraged to discuss performance advantages as well.
8b	Is the development of a cellulosic filler that makes better composites and plastics appropriate?	Unless this leads to superior end of life properties for the plastics, this would not be responsive.
8b	The description mentions cellulosic feedstocks but it was not clear if that was the only type of feedstock considered. e.g., are lipid feedstocks from algae also appropriate for this call?	Lipid feedstocks from algae would be considered appropriate for this call.
8b	Would technologies which create a value-added product from a mixed plastic stream which do not break that stream down into monomeric precursors be acceptable?"	Yes.
8b	Is a biological synthesis route required for 8b Area 1?	No.
8b	Do material properties need to be determined prior to submitting an application?	No.
8b	Is there a DOE preference for a specific source of feedstock?	No, as long as the feedstock is based on a lignocellulosic source.
8c	Are ideas allowed to incorporate technologies developed in response to previous FOAs?	The purpose of the funding opportunity is to support ideas and technologies that are not the focus area of previous funding opportunities. Applications can incorporate technologies from previous funding opportunities; however, the scope of work should be clear and distinct from previous funding opportunities.
<b>Buildings</b>		
9a	What is the TRL expected at Proposal / Phase 1 / Phase II stages?	Phase 1: TRL2-4; Phase2: TRL3-5
9a	Does this topic include novel air distribution / duct technologies?	No, but the air handler could cause innovation in those areas. The DOE in the past has funded (currently in other groups) novel air distribution / duct technologies. This is focused on the air handler.
9b	Would it be responsive to propose theoretical and computational studies of inorganic LED materials?	Such a proposal would be responsive if it represents a new and novel theoretical approach or candidate materials systems that demonstrates the potential to eclipse the price and performance of existing materials systems. In addition, such a theoretical approach must satisfy the commercialization requirements of the SBIR-STTR program (see Section B of the FOA) and not be a purely very basic, theoretical study.

9b	Would a new circuit design for a LED or OLED power supply be responsive to the topic?	This topic requests more fundamental basic research in novel materials and processes which does not appear to be the focus of a proposal to design a new circuit using existing materials and components.
9b	Would an alternative light production technology such as induction or microwave powering be responsive to this topic?	No. Presently the SSL program limits their research and development activity to only LED or OLED processes, materials and constituents due to funding limitations.
9b	Would alternative down converter technologies such as quantum dots (QDs) or nanocrystals (NCs) be responsive to this topic?	Promising alternative down converter systems that are compatible with present LED manufacturing processes and tooling are encouraged provided they represent new and novel approaches that are not duplicative of prior or presently supported research.
9b	Would a proposal to develop alternative methods of incorporating QDs or NCs into existing GaN LEDs or in AlGaAs/InGaP LEDs be considered responsive to this topic?	Yes, provided that such a proposal represents a new and novel approach or geometry and that promises to eclipse the price and performance of existing materials systems. Such a proof of principle might be the focus of the Phase I effort but the proposal should include sufficient theoretical or experimental proof that the proposed approach is possible. In addition, such an alternative approach must satisfy the commercialization requirements of the SBIR-STTR program (see Section B of the FOA) and not be a purely very basic, theoretical or demonstration study.
9b	Would a proposal to engineer Nitride multiple hetero-structures with the goal of dramatically reducing the internal stress and defects out of the crystals thought to limit green LED efficiency during the epitaxial growth process be responsive to the topic?	Yes, such a novel and challenging approach would be viewed as responsive provided the proof of principle is the focus of the Phase I effort. To be eligible for technical review however, the proposal should include sufficient theoretical or experimental proof that the proposed approach is possible and that significantly improved performance at a practical cost can be achieved. In addition, such an alternative approach must satisfy the commercialization requirements of the SBIR-STTR program (see Section B of the FOA) and not be a purely very basic, theoretical or demonstration study.
9e	Can you provide any insight in addition to the description provided in the topics document	BTO left this subtopic open ended to encourage applicants to generate more creative solutions.
9e	Will new sensing technologies for demand reduction be the interest? Is a new way of data standardization expected?	Sensing technologies themselves do not seem to have much to do with data fusion; however, sensing data (remote sensing, for example) would be a data source of interest. BTO is not asking for yet another data standard to be created.
<b>Fuel Cells</b>		
10a	Are new manufacturing methods for alternative ionomer membranes - rather than new materials development - responsive to the call?	We are interested in new materials development (i.e. non-PFSA) as the means to cost reduction, so an alternate manufacturing method would not be responsive to this subtopic.

10a	Fuel cells for vehicles would rule out PEMS high temperature fuel cells. Is this correct?	It depends on your definition of “high temperature.” We are interested in 80-120C PEMs for this subtopic, which is considered high temperature for Nafion because of the need to keep it humidified to maintain conductivity. More generically, if you are referring to high-temperature fuel cell types such as SOFCs (>600C operating temperature), then that is not of interest for the topic.
10e	What is the main focus? Is the focus catalyst design (developing new catalyst materials) or reactor/electrochemical cell or combination of both?	We are looking for innovations to catalyst and reactor design that would allow production of liquid hydrocarbons from H <sub>2</sub> and CO <sub>2</sub> and would be able to compete in price with current designs (non-PGM materials for catalysts), and retain activity and durability when subjected to multiple daily start/stop cycles consistent with renewable energy sources.
<b>Geothermal</b>		
11a	What is the maximum depth desired for data transmission for Geothermal wells?	There is no depth requirement for wells as part of this topic, but you can assume that geothermal wells are typically 2-3 km deep as a benchmark.
11a	Is simulation expected to be part of the proposal? Is hardware prototype expected at the end of Phase I?	Phase I should focus on proof of concept and bench scale testing, which may include simulation. Hardware prototype development is expected to take place in phase II.
11a	Type of MWD in present use? Data rates? Now, mostly air drilling or mud? Well depth? Vertical or horizontal? Oil? Gas?	See reference #4 in the topic: Almeida Jr., I. N., Antunes, P. D., Gonzalez, F. O. C., et al, 2015, A Review of Telemetry Data Transmission in Unconventional Petroleum Environments Focused on Information Density and Reliability, Journal of Software Engineering and Applications, Vol. 8, p. 455-462. <a href="https://file.scirp.org/pdf/JSEA_2015090414401392.pdf">https://file.scirp.org/pdf/JSEA_2015090414401392.pdf</a> .

Solar		
12a	There is a commercial instrument that measures "Real time series resistance of PV modules". What is the novelty of this technology compared to what is available in the market?	Most of the products already available in the market perform simple functions: they measure the instantaneous IV characteristic of a module, string, or array under outdoor conditions. Use of those products requires a trained electrician to disconnect the module, string, or array for testing, which is time intensive, costly, and moreover fundamentally prohibits continuous, scalable, real-time module monitoring. The RTSR technology developed by NREL analyzes the change in series resistance of a module based on a comparison of the open-circuit voltages obtained at both low- and high-irradiance operating points. If the series resistance increases over time, it is an indicator of a possible module failure (potentially catastrophically) that should trigger an investigation of the module for potential replacement. The relevant data for the RTSR analysis may be collected at the inverter (or microinverter) and thus an RTSR analysis system does not require any connection/disconnection of the module. RTSR can also be automated to be performed continuously at scale over data sets pulled from module-level electronics throughout the overall array. In other words, you can monitor the series resistance – as a proxy for the performance – of all of your modules in the field at once, with no downtime, expensive personnel, or additional equipment using this method.
12a	I am interested in applying for multiple SBIR/STTRs. Is this allowed?	This is not a topic-related question. Please refer to the funding opportunity announcement at this link: <a href="https://science.energy.gov/sbir/funding-opportunities/">https://science.energy.gov/sbir/funding-opportunities/</a>
12c	The document says "any time scale will be considered (minutes, hours, days, seasonal)", but the topic "dispatchable" implies days and seasonal for solar. Could you just clarify how minutes and hours fits?	We are interested in storage technologies with the potential to increase the utilization of solar photovoltaic generation in the grid (increased dispatchability of solar generation) at any time scale (minutes, hours, days, seasonal). Proposed solutions can focus on one or more time scale. However, applications should clearly discuss which energy value stream the proposed technology will target.
12c	Assuming novelty, relatively low cost, and high efficiency (higher than standard electrolysis), would an energy conversion/storage system and specifically an electricity-to-fuel gas system (gases including hydrogen, formic acid, and methanol) be considered responsive?	Electricity-to-fuel gas systems would not be considered responsive to this subtopic, unless they utilize solar electricity, take advantage of specific characteristics of solar photovoltaic systems, and could be co-located with them.
12c	Is a completely new non-Li battery chemistry considered responsive?	Yes, non-Li ion battery technologies are responsive to this subtopic and encouraged, if they meet the other criteria described in the subtopic language.
12d	Is research into new methods for large scale structural design responsive?	Large scale structural design might be responsive to this subtopic, if the proposed solution meets all the other requirements discussed in the subtopic language.

Vehicles		
13a	Are you open to completely new, non-lithium based batteries?	We are open to battery chemistries that have the potential power and energy densities required for automotive applications as well as have the potential to meet our performance and cost goals.
13a	You mentioned looking for a roughly 5-year commercialization timeline. Does that mean Phase 1 for this topic 31a is a bit higher TRL than usual? (Usually Phase 1 includes proof-of-concept and prototyping, right?) We have a very high energy density new battery chemistry that is only at lab proof-of-concept stage and working towards first prototypes now.	Commercialization in various applications could be further along than others. EV batteries have a longer commercialization timeline than drone batteries for instance. In phase I proposals we expect full cell data larger than coin cells at the end of the program. If the technology is not mature enough to meet that bar, it is unlikely that it is developed enough for this topic.
13a	Is it ok to submit proposals about the battery cooling systems under section 13a?	Yes.
13a	Would battery cooling system proposals be responsive?	Yes.
13a	Stability of SEI layer on silicon anode of Li-ion battery	Yes.
13b	The main goal of this topic is to overcome the limitations of currently available technologies by demonstrating the successful production of > 150A, > 1200V rated SiC devices. How important that device should be made of SiC?	It is important for us to focus on SiC devices for this topic, given their performance characteristics and current state of development.
13b	Would battery cooling technology be responsive?	No, this topic is not for batteries.
13b	What TRL level seeking for Is anodes?	This topic does not mention anodes.
13b	Can diamond material be responsive for 13b if we can provide rating significantly higher than outlined in the topic?	No diamond material would not be responsive at this time, we are focused specifically on SiC for this topic.
13c	Is there a specific engine power capacity or range that can be defined	Engine should be a modern, production automotive or heavy duty engine. Automotive engines in the US are typically >100 HP, and heavy-duty Class 8 engines can exceed 600 HP.
13c	Is there a preferable sized engine to demonstrate fuel efficiency for the Phase I? Would a 10 horsepower 1 cylinder engine work?	A 10 HP engine would not be responsive.

13d	Is propane/lpg considered responsive as an alt fuel?	No. The applications should be for liquid fuels only – i.e., liquid at standard temperature and pressure.
13d	Would a novel ignition technology be a responsive proposal?	Yes, if the proposed ignition technology enables, and is incorporated into, an engine meeting the specific requirements of the topic.
13d	Does hybrid engine (gas-electric) fit in this section?	An engine suitable for use in a hybrid vehicles would be eligible. The electric motor part of a hybrid system would not be eligible.
13e	Would technologies for improving casting metal matrix composites qualify?	Although metal matrix composites (MMCs) are not listed in the topic (cast iron, aluminum alloys, and magnesium alloys are listed in the text). However, if it can be shown that MMCs are used in high volume automotive cast components, the topic would support improvements to those casting processes.
13e	What about titanium casting components? For 99.9 % dense?	Although Titanium is not listed in the topic (cast iron, aluminum alloys, and magnesium alloys are listed in the text). However, if it can be shown that Titanium is used in high volume automotive cast components, the topic would support improvements to those casting processes. “This topic does not include a new materials development program and applications containing a new materials development program will be considered out of scope.”
13e	What is meant by glider weight in this context? Do you mean chassis, gram, or everything potentially cast?	Glider in this context is referencing a DOE weight reduction target for non-powertrain weight reduction in midsize passenger cars. The objective of this topic is, “to develop and improve casting processes that result in a significant reduction in casting imperfection leading to increases in component strength, fatigue life, and allowing redesigns that lead to significant (>20%) reductions in component weight”. The topic is not targeting a specific vehicle component but improvements to casting processes to mitigate/eliminate imperfections.
13e	Is this topic focused on commercial trucking?	No. Glider in this context is referencing a DOE weight reduction target for non-powertrain weight reduction in midsize passenger cars.
13e	So, if the target is \$5/lb saved, what materials are you seeking to improve?	The topic is not targeting a specific material or alloy but to improve the casting process (it may have greater application to some alloys, but the topic is not alloy specific): “Applications are sought to develop and improve casting processes that result in a significant reduction in casting imperfection leading to increases in component strength, fatigue life, and allowing redesigns that lead to significant (>20%) reductions in component weight.”

13e	Are you looking for proposals to redesign a component to reduce weight and to be able to do so under \$5/lb? Or, are you looking for a proposal on a process improvement that leads to >20% weight reduction?	The objective of the topic is to improve the structural integrity of castings in order to enable the weight reductions and cost targets of the program to be achieved. Casting imperfections can result in reductions in structural performance, leading to over engineering of a component and increased weight. The Topic is to improve the casting process to mitigate/eliminate these imperfections. Cost targets for the program are less than \$5 per pound saved, so a part that saves (reduces vehicle weight by) 10 pounds could have an incremental cost no greater than \$50.
13e	Would the Plasma Transferred Arc (PSA) continuous casting (additive manufacturing) coupled with Friction Stir Processing (FSP) be considered responsive to this topic?	The Topic is to improve the casting process to mitigate/eliminate these imperfections. Cost targets for the program are less than \$5 per pound saved, so a part that saves 10 pounds could have an incremental cost no greater than \$50. It may be difficult to show that a PSA/FSP approach could match the production rates or cost targets of high volume vehicle manufacturers.
13f	Thermoplastic carbon fiber, are you targeting any specific resins? PPS? Continuous fiber? Chopped fiber?	We do not target any specific fibers or resins. Thermosets or thermoplastics is fine. Continuous fiber or chopped fibers is fine.
13f	Sprung vs un-sprung vehicle weight. Generally un-sprung weight (control arms, trailing axles, etc.). Is more valuable than sprung weight (body weight), is that the case here? Two to one? (Or in this case \$10 dollars per pound vs \$5 per pound?)	We are primarily interested in glider weight (i.e., vehicle does not include powertrain system).
13f	Are you only interested in carbon fiber recycling, or would you also be interested in technologies capable of recycling E-glass reinforced automotive parts?	Preferably in carbon fiber recycling. However, E-glass recycling is also fine.
13f	Is this topic interested in new resin technology which can cure in the desired 90 sec or is it focused on low cost fibers?	Yes, we are interested in fast cure resin technology or reducing cycle time when manufacture composite parts. We are also interested in low cost fibers with good mechanical properties.
<b>Water</b>		
14a	Is a wave energy converter with internal mechanical energy storage that can support a microgrid responsive?	This is very little information to determine if a technology or system is responsive or not. FYI, we are precluded from assessing the technology being developed except through the application process.
14a	Why mention MHK and not a much more power dense Small Hydro (SMH)?	The topic is for research and development of Marine and Hydrokinetic technology. So any application must include R&D of MHK technology though topic 14.a does not preclude small modular hydropower technologies used in concert with MHK technologies for a microgrid.



14a	It seems that you are looking for an integration of two innovations, one is critical material extraction from seawater and the other one is power supply system using Marine Energy. Should the proposal have to provide both critical materials extraction and marine energy capturing system?	Yes, as stated in topic 14.d the proposed technology must be able to extract minerals from sea water using marine energy.
14a	For the Marine Energy, it seems that most of energy sources mentioned in the topic are wave and tidal energy. Are you interested in other energy sources such as the methane emitted from ocean?	No, this topic does not consider other energy sources such as the methane emitted from ocean. As stated in topic 14.d use of any type of Marine and Hydrokinetic energy is required. This includes energy from waves, tides, currents, and/or OTEC.
14a	Would a proposal involving Wave Energy be reviewed, or deemed non-responsive due to the implied preference towards river and tidal?	Any proposal involving Marine and Hydrokinetic energy including wave energy would be responsive to the topic description.
14a	Would the inclusion of micro hydro power on a remote microgrid be considered as responsive to topic 14a?	Yes, inclusion of micro-hydro in the mix with Marine and Hydrokinetic Energy in a micro-grid for sub-topic 14a is consistent with the topic description.
14a	Are there certain technology approaches that are of no interest to DOE? What are the performance expectations in Phase I as opposed to Phase II?	Any LOI's/Applications that do not include Marine and Hydrokinetic generation Technologies in the mix are not of interest under Topic 14. You are encouraged to read all the subtopics to determine the Phase I/II expectations. The applicants are free to use the limited funds in Phase I/II to advance their technologies in the most efficient manner suited to the technology being developed.
14a	Would Topic 14a consider new technology concepts that only involve ocean-based hydrokinetic energy that cannot exist elsewhere?	Topic 14a speaks generally to marine hydrokinetic energy sources. We look forward to reviewing Letters of Interest/Applications that describe how they would take an MHK energy source and do something useful with it; topic 14a is specific to a microgrid in a remote community.
14a	Would an ocean-based gravity storage be considered instead of pumped storage hydropower?	We are not able to assess the technology except through the application process. I would encourage you to describe the technology thoroughly and discuss how it meets the intent of the topic in your LOI/Application.
14a	For Phase I, it says component level testing. Does it mean Phase I should focus only on individual component testing?	The topic description requires proof of concept for the proposed microgrid. This requirement has multiple items including component level testing.
14b	Is a system that combines MHK energy generation and storage responsive?	It appears that such a technology would be responsive though this is very little information to determine if a technology or system is responsive or not

14b	For Phase I will numerical modeling and/or computational fluid dynamics (CFD) analysis be acceptable in lieu of laboratory testing?	Yes, numerical modeling/CFD analysis may be used for early stage, proof of concept research during Phase I. Applicants are encouraged to make the best use of the limited time and resources available in Phase I.
<b>Wind</b>		
15b	1) Since most offshore wind is abroad in Europe, can we develop the solution onshore here at a wind farm in the US? 2) Can we partner with a large wind farm owner/operator to develop, deploy and test our technology/analytics on their operating data? 3) Does the solution need to include hardware + software, or are advanced software analytics ok?	1) Yes, the goal is to develop solutions targeting the specific challenges associated with offshore turbines; the approach to develop the technology does not necessarily have to involve offshore turbines at all stages. Using land-based turbines for part of the development would be an acceptable approach. 2) Yes. 3) There needs to be a viable path to commercialization. If the software can make use of other commercially available hardware that would be acceptable, but that approach would need to be well defined in the proposal.
15b	Does this topic originate with a specific commercial entity or organization that would purchase developed tech.?	This topic addresses one of the Action Areas identified in the U.S. Department of Interior, 2016, National Offshore Wind Strategy: Facilitating the Development of the Offshore Wind Industry in the United States, U.S. Department of Energy, <a href="http://energy.gov/sites/prod/files/2016/09/f33/National-Offshore-Wind-Strategy-report-09082016.pdf">http://energy.gov/sites/prod/files/2016/09/f33/National-Offshore-Wind-Strategy-report-09082016.pdf</a> , Action Area 1.3: Installation, Operation and Maintenance, and Supply Chain Solutions.
15b	Can the analytics/prognostics be built/derived from onshore wind assets, which will then be deployed offshore?	Yes, the goal is to develop solutions targeting the specific challenges associated with offshore turbines; the approach to develop the technology does not necessarily have to involve offshore turbines at all stages.
<b>Advanced Manufacturing - Geothermal Joint Topic</b>		
17a	Can Reverse osmosis be in addition to the process in the geothermal process?	We do not specifically exclude reverse osmosis (RO) from topic 17a; however, since RO is pressure driven and the process for topic 17a must use a geothermal heat source, the addition of RO is probably not going to be competitive for a thermal desalination process. Topic 17b may be a better fit for RO desalination.
<b>General Questions</b>		
-	Is there any limitation in number of proposals to be submitted?	There is a limit of 10 Letters of Intent and 10 proposals. See the FOA at <a href="https://science.energy.gov/sbir/funding-opportunities/">https://science.energy.gov/sbir/funding-opportunities/</a>
-	Are you allowed to submit the same proposal to multiple topics?	No. See the FOA at <a href="https://science.energy.gov/sbir/funding-opportunities/">https://science.energy.gov/sbir/funding-opportunities/</a>