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SUSTAINMENT

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MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, ENERGY, AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY, INSTALLATIONS, AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS, ENVIRONMENT, AND ENERGY)
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Report on Alternative Financing for Energy Resilience Projects – Establishment of a Defense Energy Resilience Bank for National Security

As described in the 2018 National Defense Strategy, the velocity and variety of global threats continues to evolve, and we must anticipate attacks and mitigate risks to our critical infrastructure. The homeland is no longer a sanctuary, and maintaining secure access to energy resources is critical to the Department's execution of its mission.

The Department is committed to improving energy resilience at its military installations to ensure the readiness of the armed forces. In a constrained budgetary environment, the Department is unable to fund all installation energy resilience projects solely through appropriations and must therefore leverage alternative sources of financing.

My office, under the Office of the Assistant Secretary of Defense for Sustainment (OASD(S)), commissioned the subject report to explore policy and programmatic solutions to accelerate alternative financing of energy resilience projects. The report provides recommendations on increasing the availability, access, and volume of third-party financing to fund mission-critical energy resilience projects across military installations. My office will continue to coordinate with the DoD Components to explore the feasibility of implementing these recommendations.

Please direct all questions regarding this document to Mr. Walter Ludwig, who can be reached at 571-372-6859. Thank you for your continued support.

Lisa A. Jung
Deputy Assistant Secretary of Defense for Energy

Attachments:
As stated

Department of Defense

Alternative Financing for Energy Resilience Projects – Establishment of a Defense Energy Resilience Bank (DERB) for National Security

Office of the Deputy Assistant Secretary of Defense, Energy (ODASD(Energy))

Prepared by Deloitte Financial Advisory Services LLP ("Deloitte FAS")

February 2020

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Acronyms

Acronyms	Full Phrase
ABT	Additional Bonds Tests
AEMRR	Annual Energy Management and Resilience Report
ASD(S)	Assistant Secretary of Defense for Sustainment
BUILD	Better Utilization of Investments Leading to Development
DCA	Development Credit Authority
DERB	Defense Energy Resilience Bank
DLA	Defense Logistics Agency
DoD	Department of Defense
DoDD	Department of Defense Directives
DoDI	Department of Defense Instructions
DoE	Department of Energy
DOT	Department of Transportation
DSCR	Debt Service Coverage Ratio
DSRA	Debt Service Reserve Account
EaaS	Energy as a Service
EPA	Environmental Protection Agency
ERA	Energy Resilience Assessment
ERCIP	Energy Resilience and Conservation Investment Program
ESCO	Energy Services Company
ESPC	Energy Savings Performance Contract
ESPO	Energy Security Programs Office
ESTCP	Environmental Security Technology Certification Program
EUL	Enhanced Use Lease
EXIM	Export-Import Bank of the United States
FEMP	Federal Energy Management Program
FSRM	Facility Sustainment, Restoration, and Modernization
FY	Fiscal Year
IE	Installation Energy
IEP	Installation Energy Plan
IGSA	Intergovernmental Support Agreement

Acronyms	Full Phrase
IKC	In-Kind Consideration
KPI	Key Performance Indicator
LLCR	Loan Life Coverage Ratio
LPC	Loan Programs Office
MCC	Millennium Challenge Corporation
MILCON	Military Construction
MIT-LL	Massachusetts Institute of Technology Lincoln Laboratory
NDAA	National Defense Authorization Act
NDS	National Defense Strategy
O&M	Operations and Maintenance
OASD(S)	Office of the Assistant Secretary of Defense for Sustainment
ODASD(Energy)	Office of the Deputy Assistant Secretary of Defense for Energy
OE	Operational Energy
OEA	Office of Energy Assurance
OEI	Office of Energy Initiatives
OMB	Office of Management and Budget
OPIC	Overseas Private Investment Corporation
OSD	Office of the Secretary of Defense
PPA	Power Purchase Agreement
PV	Photovoltaic
RFP	Request for Proposals
ROE	Return on Equity
RRIF	Railroad Rehabilitation and Improvement Financing
SECDEF	Secretary of Defense
SIR	Savings to Investment Ratio
TIFIA	Transportation Infrastructure Finance and Innovation Act
UESC	Utility Energy Services Contract
USACE	U.S. Army Corps of Engineers
USADF	U.S. African Development Foundation
USAID	U.S. Agency for International Development
USC	United States Code

Acronyms	Full Phrase
USTDA	U.S. Trade and Development Agency
UP	Utilities Privatization
WIFIA	Water Infrastructure Finance and Innovation Act

1 Executive Summary

1.1 Introduction

The Department of Defense (DoD) operates military installations in the United States and overseas that serve as force projection platforms to execute missions and deploy and sustain forces rapidly and effectively in support of national security. Mission critical tasks embedded in installation operations require energy availability and resilience to ensure mission assurance and readiness. Energy resilience is an integral component of the 2018 United States National Defense Strategy (NDS) Lines of Effort to "build a more lethal force," and to "reform the Department's business practices for greater performance and affordability." Building a more lethal force with resilient energy systems and achieving energy resilience goals within the budget framework is a key consideration and priority for the DoD.

The Office of the Deputy Assistant Secretary of Defense for Energy (ODASD(Energy) under the Office of the Assistant Secretary of Defense for Sustainment (OASD(S)) commissioned this report to explore policy and programmatic solutions to accelerate alternative financing of energy resilience projects. This report provides recommendations to the Office of the Secretary of Defense (OSD) on increasing the availability, access, and volume of third-party financing to fund mission-critical energy resilience projects across all DoD installations.

The report's scope included collaboration with the Massachusetts Institute of Technology Lincoln Laboratory (MIT-LL) to review data and information on DoD energy resilience projects to inform development of a risk rating tool. In this report, Deloitte Financial Advisory Services LLP (hereafter "Deloitte") identified and evaluated different energy resilience projects that the service branches are considering or currently implementing. Having a view of total funding requirements, allocated funding, and the funding gap between the two provides insight into the volume and types of energy resilience projects underway to achieve service branch resilience requirements. This approach is important in identifying the most suitable ways to finance these projects, recognizing that project developers, equity investors, and lenders will evaluate the financial and commercial merits of energy resilience projects differently. Understanding the risk profile of the types of resilience projects is important in identifying which ones may be attractive to alternative financing.

1.2 Background

Energy resilience is the ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated energy disruptions in order to ensure energy availability and reliability sufficient to provide for mission assurance and readiness. This includes mission essential operations related to readiness, and to execute or rapidly reestablish mission essential requirements.[1] Threats to energy resilience include cyber and physical attacks, natural disasters, and reliability risks due to aging equipment, substandard performance, and other operational factors. As of fiscal year (FY) 2019, DoD infrastructure oversight includes 276,561 buildings, representing 2.267 billion square feet across 500+ global installations, all of which operate mission-critical energy systems. The DoD's annual energy expense of $3.5 billion is its largest

[1] 101(e)(6) of title 10, U.S.C

base-level installation cost for maintaining operational readiness. Given the high energy cost to meet operational requirements, energy resilience is critical to ensure available, reliable, and efficient power to continuously accomplish DoD missions.

DoD energy resilience guidelines and requirements are outlined through various policies and directives. These include the following core documents and guidelines:

- Title 10, United States Code
- National Defense Authorization Acts (NDAA)
- Department of Defense Appropriations Acts
- DoD Instruction 4170.11 – Installation Energy Management, Energy Resilience[2]

DoD ensures energy resilience through the use of appropriated funds and alternative financing. Appropriated funds can include operation and maintenance (O&M) budgets for meeting day-to-day operating expenses, including utility bills. While funded with O&M, utility costs are non-discretionary and based on actual energy load consumed. Other funding sources include Military Construction (MILCON) and Facilities Sustainment, Restoration, and Modernization (FSRM) accounts. Within the MILCON appropriation is an energy-specific program called the Energy Resilience and Conservation Investment Program (ERCIP). Energy projects—which include energy efficiency, renewable energy, and energy resilience projects—compete for limited appropriated MILCON, ERCIP, and FSRM funding with other installation projects.

In a constrained budgetary environment, service branches and their installations are unable to fulfill DoD energy resilience requirements solely with appropriated funding allocations. When appropriated funds are not available, alternative financing provides an opportunity for DoD to nonetheless meet requirements for energy resilience. However, alternative financing projects must be well managed to ensure best value to the taxpayer as these projects are paid back over time using appropriated funding. They also should be structured to incorporate commercially acceptable market returns for investors and sufficient capacity to repay borrowings by commercial operators needed to fund project capital expenditures.

1.3 Findings

This report presents an overview of economic, technical, and financial metrics, including energy project life-cycle costs, that are important to DoD, service branch, and private sector stakeholders in evaluating energy resilience projects for alternative financing, as discussed and detailed in Deliverable 5.1. Project developers, energy services companies (ESCOs), utility providers, and their financial partners have an obligation to their stakeholders as they pursue any energy project, while the DoD has an obligation to the taxpayer to pursue best value energy projects to meet its national security objectives. More specifically, private sector stakeholders require adequate compensation or a well-defined financial benefit to develop excess power generation capacity for use during emergencies. This requirement for energy resilience may differ from the typical consideration of DoD installation energy managers, who are otherwise required to focus on the lowest life-cycle cost solutions to meet energy resilience requirements. While these two objectives may differ, increasing the transparency of the financial transaction from lender-to-vendor-to-

[2] Updated March 16, 2016

customer should help align interests to increase the availability of and accelerate completion of alternative financing for resilience projects. Not every mission-critical installation energy project will be commercially viable or capable of attracting private capital, and, in some cases, the added costs of involving private third parties to address energy resilience gaps may not be in the DoD's best financial interests. Aligning interests between the DoD, project developers, and financial partners is important for attracting alternative financing to those projects that generate a commercially acceptable return, have adequate cash flows to support loan payments, and have a high probability of success or reaching closure. When present, these elements combine to form a "bankable" or "financeable" project, as deemed by the financial community. Bankable projects are deemed creditworthy by lenders, with a sufficient revenue or cash flow source for repayment. Utilizing alternative or private financing options to fund bankable energy resilience projects will subsequently allow scarce appropriated facilities investment funds to support non-commercially financeable projects that are still mission critical to meet resilience requirements.

This report synthesizes findings from multiple interviews conducted by Deloitte with commercial project developers, energy services companies, investors, banks, and other financial parties active in the energy sector regarding impediments to accelerate alternative financing for energy resilience projects. Deloitte interviewed third parties actively involved in funding alternative energy projects, both within and outside of the DoD, as well as commercial parties not currently active in this market, in order to gain a broad perspective on constraints and challenges. The impediments, challenges, and recommendations articulated by these institutions during the interviews are summarized in Section 3 of this report.

These findings identify several challenges to accelerating alternative financing, including creating better awareness of project pipelines, bringing bankable projects to market with a high probability of closure (to include quantifying the value of resilience), developing more consistency and transparency in contracting processes, adopting market terms for risk allocation, and combining similar projects to create larger and more consistent financing opportunities. Private sector investors typically must navigate a complicated bureaucracy and invest a significant amount of time to execute transactions. After completing one transaction, successive opportunities may be several years apart and may not fully realize the lessons learned from previous successful transaction because the DoD counterpart may be different. Alternative financing procurements and tenders can be complex, with lengthy completion cycles, due to multiple stakeholders with competing interests. Without the right incentives, transparency, enabling tools, and high probability of project completion needed to reach project closure, stakeholders across both the DoD and private sector are often reluctant to pursue alternative financing.

To overcome these challenges, this report makes recommendations to align mutual interests between service branches with vendors and financial industry partners. These recommendations to improve processes and procedures can lead to increased volumes of alternative financed projects coming to market and reaching closure, thus increasing the availability of external financing to address mission-critical resilience projects, and potentially lowering overall project costs through increased private sector competition and interest in DoD resilience projects.

Financing parties, and banks or lenders in particular, utilize qualitative and quantitative metrics to better review and evaluate risks for projects. Understanding these metrics will help the DoD to evaluate at a pre-feasibility stage which projects will generate interest from the financial community, and thus have the greatest likelihood of bankability or reaching closure if brought to market. The DoD's ability to reduce and eliminate execution obstacles and employ appropriate

risk mitigation tools can improve mutual understanding between the different defense agencies, the financial community, and the developer or operator, thereby streamlining the process, shortening the timelines between project concept and financial closing, and increasing project throughput. Reducing risks should thus provide more attractive commercial terms and financing arrangements for the DoD on future resilience projects, including lower costs.

The categories of risk that the financial industry evaluates include: revenue, market, technical and operating, and financial. Best practice involves allocating these risks to project parties that are best able to bear them. In addition, the financial community has numerous mechanisms and contracting precedents to mitigate these particular risks, some of which will align with DoD interests and incentives. The DoD can utilize private sector feedback, contract templates, and inputs, as well as various financial, market-based, and legal tools to identify and advance resilience projects where these risk mitigation measures align with those of the financial industry.

1.4 Recommendations

This report incorporates Deloitte's analysis, including due diligence interviews, to make recommendations across three categories in order to increase access to alternative financing, accelerate the flow of resilience projects towards closure, and expand the pool of competent financial and development stakeholders interested in DoD energy resilience projects. Section 5 of this report details these categories of recommendations to accelerate alternative financing of resilience projects:

1) **Establish a Center of Excellence for Resilience Projects Within the DoD.** Beneficial outcomes of this Center of Excellence will include improved project quality, increased transparency into the pipeline of commercially viable projects, increased and more direct access to the financial and developer community as projects are being developed, and expanded knowledge and understanding within the DoD of leading practices and commercial rationale of alternative financing sources. A core function of the Center of Excellence should be periodic industry days involving lenders, developers, ESCOs, and service branches to present the pipeline of pending resilience projects expected to come to market for development and funding in the next six to twenty-four months.

   Deloitte's analysis and interviews indicated that the Center of Excellence can increase interest from the private sector by providing a singular, easily identifiable communication point on potential projects. In addition, this Center would work with internal and external stakeholders to create a more robust marketplace that pairs projects with appropriate alternative financing vehicles and DoD energy resilience execution offices. In practice, this could increase awareness of alternative energy projects and ultimately increase the pool of participating lenders and investors, thereby accelerating project closings and potentially lowering transaction and financing costs for DoD service branches.

2) **Establish a Clearly-Defined Energy Resilience Goal.** Congress has made energy resilience a priority, and this report recommends OSD establish a clear process within the DoD to develop an energy resilience goal. Multiple stakeholders agreed that resilience is a separate objective from cost savings or efficiency, and the goals and targets for achieving and measuring resilience need to be more clearly articulated and clarified in national DoD policy. Absent a goal, subsequent administrations or political agendas may deprioritize resilience requirements. This factor is seen as a considerable risk for the private sector in the current environment. The policy objectives of a resilience goal could include:

- Improve critical mission readiness and continuity of operations;
- Reduce disruptions to energy systems; and
- Enhance national security.

Creating a goal allows the DoD to standardize resilience expectations and create leverage to allow services to pursue energy resilience initiatives. Energy resilience is a critical support element for mission continuity and national security, especially in the face of energy disruptions that hinder the ability of the DoD to conduct critical missions on its military installations. Section 5 further articulates the benefits and potential quantifiable metrics that could be used in setting a resilience goal or target by the DoD.

3) **Create the Defense Energy Resilience Bank (DERB).** A DERB entity would serve as a financing mechanism or development authority to access federal financing sources, drawing on existing federal credit subsidy or loan guarantee programs. The DoD can look to other federal programs that have successfully leveraged federal funds to leverage and stimulate private investments and lending in transportation, water, and energy infrastructure. Existing credit subsidy and loan guarantee programs at the U.S. Department of Transportation (DOT), Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), U.S. Agency for International Development (USAID) and others mobilized over $150 billion in private-sector financing for priority infrastructure projects. These existing, successful federal programs accelerate access to third-party financing. This report provides case studies of relevant government agency infrastructure support programs and tools designed to improve access to third-party financing.

1.5 Conclusion

While tactical and fiscal challenges remain to scaling up the DoD's use of third-party investment to efficiently achieve its mission of energy resilience, the customer, vendor, and financer all have incentives to execute projects efficiently. The strategic objectives among these central actors for the execution of alternative financing include: DoD and the service branches represent a robust market opportunity with policy and legislative authorities at its disposal to engage with private parties on energy resilience projects; financial partners have access to billions of dollars in capital seeking infrastructure opportunities, if bankable or financeable projects can be brought to market; and utilities, ESCOs, and project developers are motivated to identify and deliver cost-effective energy projects to their rate-bases and shareholders. Aligning incentives can help reduce project execution risk, increase the flow and volume of projects, and expand access to affordable financing for DoD resilience projects. This report supports the DoD in taking advantage of this strategic opportunity.

2 Background

The OASD(S) commissioned this report to increase the availability of different financial tools and authorities to allow installation management commands greater visibility on how to develop and implement alternative financing authorities for energy resilience projects. This report provides recommendations to OSD to increase the availability, access, and volume of alternative financing to fund mission-critical energy resilience projects across DoD installations.

2.1 Role of ODASD(Energy)

ODASD(Energy) is positioned within the OASD(S) organizational structure. The Assistant Secretary of Defense for Sustainment (ASD(S)) prescribes policies and procedures, provides guidance, and monitors and reviews programs related to energy, environment, facilities management, infrastructure, logistics, and materiel readiness in the DoD.[3]

The mission of ODASD(Energy) is to sustain warfighting readiness and lethality by providing all energy-related policy and governance for programs and activities that enable resilient, efficient, and cyber-secure energy for Joint forces, weapon systems and installations. To accomplish this mission, ODASD(Energy) supports initiatives across four primary areas:

- Energy Resilience: Enhancing the military capability, readiness, and resilience of our installations and forces through assured access to resilient and cyber secure fuel and power.
- Energy Risk: Identifying, assessing, and integrating energy-related analyses and risks into Department decision-making associated with requirements, deliberate planning, wargames and exercises, installation master planning, Energy Resilience and Conservation Investment Program (ERCIP), and investments in forces and installations.
- Energy Performance: Ensuring energy efficiency and lower costs at DoD installations through reliable, efficient use of power and alternative financing mechanisms.
- Cyber Secure Facilities: Reducing the cyber risks to facility related control systems to ensure reliable power for critical missions.[4]

While ODASD(Energy) encompasses both operational energy (OE) and installation energy (IE), the scope of this report focuses on installation energy. Installations provide bases from which warfighters can fight, train, and live. Improving energy resilience and reliability on installations allows installation energy to serve as a force multiplier in support of military readiness.

2.2 Overview of Energy Resilience Authorities, Policy, and Directives

This section provides an overview of the authorities for funding and financing energy projects on DoD installations, and how they are currently being used in the DoD. Commonly used third-party

[3] https://www.acq.osd.mil/log/LMR/about_lmr.html
[4] https://www.acq.osd.mil/log/ENR/index.html

financing tools are presented first, followed by appropriated funding authorities, and additional programs also available to DoD installations that are less commonly used in practice.

Third-Party Financing Authorities

The DoD actively uses third-party financing tools and has experienced substantial success. Through FY 2018, the DoD and service branches had approved approximately $3.1 billion in alternative-financing projects for energy and water resilience at installations worldwide. This included awards by the Navy and Marine Corps ($834 million), the Air Force ($767 million), and the Army ($1,487 million)[5], confirming that all service branches are actively utilizing alternative-financing vehicles. These financing tools will grow more important to providing resilience and access to alternative financing for energy projects, given declining appropriations budgets and increasing threats to installation resilience.

Table 1: Existing Authorities Leveraged by the DoD to Pursue Alternative Financing

Existing Authorities	Deloitte Understanding
Enhanced Use Lease (EUL) - 10 U.S.C. §2667	Allows underutilized land to be leased in exchange for in-kind consideration such as cash rents or infrastructure improvements.
Energy Savings Performance Contracts (ESPCs) - 42 U.S.C. §8287	Allows the Department of Defense to enter into contracts for the purpose of achieving energy savings and benefits ancillary to that purpose, for a period not to exceed 25 years.
Utility Energy Service Contracts (UESCs) - 10 U.S.C. §2913	Allows procurement of cost-effective demand and conservation incentive programs including energy services, facilities alterations, and energy saving devices from a serving utility for energy- and water-efficiency improvements and demand-reduction services, with performance assurance of installed equipment.
Power Purchasing Agreement (PPA) - 10 U.S.C. §2922a	Contractual obligation between a seller of energy and a purchaser, such as an installation. PPAs typically include minimum payment provisions with long-term contract durations, with assets owned and operated by an external entity.
Utility Privatization (UP) - 10 U.S.C. §2688	Shifts the role of owner/operator of utility system(s) to a non-DoD partner. Capital investments are funded by the partner. UP creates long-term contractual liabilities paid out through the annual service branch O&M appropriation budget.
Development of Geothermal Energy on Military Land - 10 U.S.C. §2917(a)	Allows development of geothermal energy resource within lands under the Secretary of a military department's jurisdiction, including public lands, through real estate agreements and/or other acquisition methods.

Through a UESC, a serving utility or ESCO provides energy management services such as energy- and water-efficiency improvements and demand-reduction services. The utility provider designs, finances, and builds the project, and is paid from the resulting savings, typically through the utility bill. UESCs are an attractive financing mechanism for energy resilience projects as resilience is a

[5] Funding levels and project costs are based on data shared by the ODASD(Energy).

core business within the provider's own systems. Since UESCs are not subject to Federal Acquisition Regulations (FAR) to the same extent as other authorities, UESCs can potentially be implemented more quickly, in as little as 9 to 12 months in some successful examples.

Any agency pursuing a UESC has access to Federal Energy Management Program (FEMP) support at no additional cost. FEMP assists federal agencies to meet energy- and water-related goals by bringing together public and private sector stakeholders and identifying government best practices. FEMP issues legislative and executive guidance, facilitates technology integration, and provides technical assistance to leverage funding sources, among other support components. UESCs do not require specific cost-savings guarantees from implementing partners and may not achieve the degree of cost savings expected during design, construction, and performance period.

ESPCs allow private contractors to design, finance, acquire, install, operate, and maintain energy-saving equipment for a federal installation. Energy projects implemented through an ESPC are limited to a maximum contract term of 25 years. Unlike UESCs, ESPCs require a specific cost-savings performance guarantee, and the implementer must perform required maintenance, repair, and replacement for the full contract term. These contracts can require longer periods of time to negotiate and implement, and can often involve complex negotiations on costs, savings, escalation clauses, and performance metrics. If a FEMP contract vehicle is used, federal agencies must use a certified FEMP project facilitator. Title 10 U.S.C. § 2912 allows half of the cost savings realized from ESPCs to be used for additional energy measures as designated by the head of the department where the savings were realized and the other half to be used at the installation where the savings were realized.

Table 2 compares and contrasts some of the key aspects of UESCs with ESPCs.

Table 2: Comparison of UESCs and ESPCs

	Third-Party Role	Repayment Source	Contracting Time	Savings M&V / Performance Assurance
UESC	Design, build, finance energy efficiency improvements/ demand reduction services	Resulting energy savings (utility bill)	9 – 18 months, on average (estimated)	Not required / No guaranteed savings
ESPC	Design, finance, acquire/install, maintain energy saving equipment	Guaranteed energy savings	Can require multiple years	Required / Guaranteed savings

EULs, as authorized under 10 U.S.C. § 2667, allow the DoD to lease land to a developer in exchange for "in-kind consideration" (IKC). EULs are effective for bringing commercial expertise in certain services to installations, including energy projects. In the energy context, typically the DoD leases land on an installation to a developer to build a new generation facility, such as a solar photovoltaic (PV) farm. The developer then sells the power off-base to a local utility or commercial offtaker. As the IKC of the underutilized land, the developer provides the construction, operation, and maintenance of the energy generating infrastructure and provides utility services and/or access to the generated energy during a commercial grid outage. Most important, the installation receives a priority claim to the power generated in the event of a power outage, providing a quality source of backup electricity and enhanced resilience to the base. The IKC must be no less than the value of the land.

PPAs assign the risk of constructing, owning, and operating a generation project to private developers. Under a PPA, the project developer designs, finances, builds, owns, operates, and maintains a generation project on or near an installation. The installation contracts with the developer to purchase electricity at an agreed-upon price for an agreed-upon period of time. The developer may also contract with a local utility to distribute any additional electricity. PPA terms can last for up to 30 years, can be complex to negotiate, and can take multiple years to execute given their risk and complexity. PPAs are most often used for utility-scale projects, where an installation is able to offset the amount of power they may be able to procure from conventional resources.

Through UP, on-base utility systems are sold to a third-party company that takes responsibility for operating, maintaining, and improving the utility system. The government still owns the land around the system, but provides access through a right-of-way or easement. UP creates efficiency by transferring the risks of operating and maintaining utility systems to a third-party capable of bearing the risks—typically the utility provider. The Defense Logistics Agency (DLA) Energy Utility Services provides contracting and technical support for service partners privatizing government-owned water, wastewater, electric, and natural gas distribution systems.

Other Appropriated Funding Authorities

Appropriated funds can include O&M resources for meeting day-to-day operating expenses, including utility bills. Other appropriated funds include MILCON and FSRM appropriated funds. Energy projects—which include energy efficiency, renewable energy, and energy resilience projects—compete for constrained appropriated MILCON and FSRM funding with other installation projects.

ERCIP funds projects that save energy and water, reduce DoD energy costs, improve energy resilience and security, and contribute to mission readiness through construction of new, high-efficiency energy systems and technologies or through modernizing existing energy systems. ERCIP is funded through appropriated MILCON funds. With ERCIP funding, the DoD retains ownership of purchased energy assets, with responsibility for O&M and subsequent capital improvements. ERCIP construction funds may not be augmented by any other funding source, according to FY 2019-2020 guidance.

Two additional resources that provide limited support via financial incentives and grants to DoD resilience projects include the Energy Savings Financial Incentives Fund and the Federal Energy Efficiency Fund. These funds are used less frequently than the authorities and appropriations programs outlined above.

Acquisition Tools

The DoD established the Environmental Security Technology Certification Program (ESTCP) to help innovative technologies that have established proof of concept move to field or production use. The projects must demonstrate improved performance and cost savings. Program areas include installation energy and water, environmental restoration, munitions response, resource conservation and resiliency, and weapons systems and platforms.

The SECDEF can enter into intergovernmental support agreements (IGSAs) with state and local governments for installation-support services for a maximum of 10 years. IGSAs can help installations achieve cost savings and avoid costs. The Navy and Marine Corps are in the early stages of using IGSAs, as are the Army and Air Force.

Other transactional authorities (OTAs) are available to the DoD but have not been widely used for energy resilience projects. OTAs are also implemented between a federal agency and commercial sector partner using appropriated funds.

2.3 Energy Project Funding and Financing Overview

The funding gap between installation energy investment requirements and federal appropriations available for installation energy is increasing each year, due to mandated energy resilience and mission readiness requirements and identified threats to energy security. As the service branches finalize installation energy plans (IEPs) at the base level, the investment requirements to achieve resiliency objectives across all the service branches will further increase. IEPs are intended to ensure that the resiliency, reliability, and efficiency needs of each installation energy system are identified and that a strategy is put into place to meet energy needs and close current energy gaps.

In parallel, funding appropriated to installation energy projects through MILCON, ERCIP, and other programs is insufficient to pay for all new projects that are required. The DoD therefore must leverage third-party financing, performance contracting, and other alternative-financing vehicles to close this funding gap. Traditionally, ERCIP focused on small projects that reduced energy costs. This focus is shifting towards improving energy resilience and security, availability, reliability, and economic performance (ROI/SIR still documented and considered). The ERCIP projects selected for FY 2018 and FY 2019 have an average savings-to-investment ratio (SIR) of over 2.1, indicating the estimated savings are more than twice the expected investment costs. Increasingly, projects with higher SIR should be first pursued using UESCs and ESPCs before consideration for ERCIP since these projects are typically more financeable or bankable for the commercial sector. A more efficient use of appropriated federal funding would allocate MILCON and ERCIP appropriations to those projects that close resilience gaps or improve energy security, but do not necessarily generate a cost savings. Examples of these types of projects that achieve resilience objectives but may not produce cost reductions include microgrid installations, automated smart metering systems, and cybersecurity systems to island or contain power system disruptions.

Financial Industry Perspective on Providing Alternative Financing to DoD

Commercial parties will evaluate projects based on repayment capacity and financial viability, in addition to mission and project requirements. Private sector investors require commercially acceptable returns on their projects to maintain business operations and demonstrate efficient and productive use of their capital. Investors, lenders, and developers actively compete with one another in the market to identify and fund commercially viable, bankable infrastructure projects. Private capital providers in U.S. energy markets often comment that bottlenecks to project funding do not come from too little capital availability, but from too few bankable projects coming to market that get closed. When considering investment opportunities with the DoD, private companies also balance other project opportunities, and will make marketing and investment decisions based on projected risks and returns of a given project. Financiers also evaluate the expected pipeline of projects coming to market, with a strong preference to invest in multiple energy projects on a regular basis than in one-off or single purpose opportunities.

In the United States, the private sector has established a successful track record of financing and developing public sector energy projects. Many of the energy project risk assessment and decision-making processes used by private parties also apply to DoD energy projects. Large-scale energy projects can introduce additional complexities due to the involvement of numerous

stakeholders from the DoD to the project developer, equity investors, and lenders. The DoD also has additional constraints, however, from policy, process, mission requirements, and legal authority.

Risk analysis and mitigation, often codified through standard contract terms and conditions, are core criteria in the decision for a lender to support a developer or a project. Prior to any investment or lending decision, capital providers assess how the risks associated with the project or business may impact their returns. They then evaluate whether those risks are encapsulated in contract terms that are consistent with similar energy or infrastructure projects receiving funding in the market. Capital providers aim to understand, quantify, and mitigate these risks.

Risk mitigation can be achieved through different instruments and inputs. Regardless of the form that the risk mitigation instruments take, the underlying rationale is to reduce the potential adverse effects caused by a specific risk on a project by allocating the risk to the project party best suited to achieve this result. For example, an experienced construction contractor will have the processes, institutional knowledge, staff experience, and incentives to mitigate construction risk successfully. By transferring construction risk to such a contractor through carefully designed and consistent contract language, the equity owners will mitigate uncertainty associated with construction and will provide comfort to different capital providers (inclusive of lenders).

Risk reduction not only provides increased delivery certainty, but also has a direct relationship with the project's financial performance. Revenue risk mitigation can increase the likelihood of generating sufficient cash flows to pay for all the project's obligations fully. Operations risk mitigation supports the safe performance of the project. Capital providers will review all mitigation instruments and approaches and the remaining perceived risk will be quantified through the cost of capital provided to the project and the commitment to invest or lend.

2.3.1 Overview of Risk Factors of Power Sector Projects

The risk factors that credit rating agencies use to evaluate risk within projects can broadly be grouped into four main categories: revenue, market, technical and operating, and financial.

Revenue risk is comprised of two distinct sub-risks: quality and diversity of the cash flows and contractual terms. Inputs to revenue risk evaluations include the project cost structure, tariff or revenue charged to customer, coverage of revenues over costs, and sustainability of revenue or cash flow metrics over the project life. Market risk assesses the relative position and competitiveness of the project in the market, including the commercial viability of the project, its offtakers or customers, type of market (regulated or deregulated), and position relative to other alternative energy sources. Technical and operating risk includes the technology utilized to develop the project, construction requirements, performance risk, and sponsor/developer expertise in constructing or operating similar types of projects. Lenders prefer projects that rely on common, proven technologies. This risk category also includes construction risk. Construction risk is the risk that the project will not be delivered on time, on budget, or in alignment with technical and operating standards, as defined in the construction contracts. Construction risks can lead to delays or cost overruns that reduce the financial viability of the project. The financial industry will evaluate the O&M plan, the ability of the developer to operate and maintain the project, and any third-party contract related to O&M. Investors and lenders will also review the ability of the sponsor or developer to finance, cover any cost overrun, and operate and maintain the project.

Alternative financing providers evaluate fundamental project financial metrics, which can include debt service coverage and leverage ratios generated by the project during its operational period. They will analyze key metrics over the life of the project under various "stress" scenarios to inform their investment or lending decision. Lenders tend to adopt a more conservative approach to risk inputs and tools than equity investors, given the lower, capped financial returns of senior debt instruments compared to equity investments. Lender risk mitigation analysis will be tailored towards protecting their loan and ensuring repayment certainty. It is impossible to eliminate all risk from a project. However, investors seek to be informed about the risks they can identify and potentially reduce or mitigate through proper contract structuring. Investors also seek to clearly understand the process of mitigating risks they have not identified, but may occur through detailed contracts and remedy provisions.

2.4 Technical and Economic Metrics for Energy Resilience

Energy resilience can be viewed as a means for the DoD to mitigate risks associated with achieving mission readiness on service branch installations. The development of energy resilience infrastructure projects is in itself a risk-prone activity, from construction to operations. As discussed above, the adequate allocation and mitigation of these project-related risks will form the basis for evaluation of these projects by potential capital providers. For these capital providers, particularly lenders, the objective is to increase the likelihood that their capital or loan will be repaid according to the terms negotiated with the developer.

In addition to DoD policy guidelines on resilience priorities, economic and technical metrics are also critical for identifying the most appropriate projects to achieve energy resilience. This section presents the essential life-cycle cost elements that should be considered when deciding on an appropriate acquisition vehicle for third-party financing, or whether to utilize internal capital funds for energy resilience projects.

Levelized cost of energy (LCOE) is a widely accepted metric to compare economic life-cycle costs of different generation technologies. LCOE is an economic assessment of the average total cost to build and operate a power-generating asset over its lifetime, divided by the total energy output of the asset over that lifetime. LCOE is a useful tool in comparing technologies as it strives to account for differences in the total life-cycle and fuel costs of various technologies and to normalize the cost of total power produced across these asset classes.

The availability of power to on-site critical energy loads is a metric that can be used to measure energy resilience during times of grid outage. This metric can be evaluated on a case-by-case basis or over a period of time, but cannot be considered on its own as there are economic trade-offs for selecting particular technologies. The aim of any energy resilience project would be to ensure that it is able to support mission-critical assets such that mission uptime meets the mission availability requirement. The Risk Rating Tool developed as part of this report (described in Section 4) helps address this gap by showing the financial implications for different technologies, and illustrating the likelihood that they can be alternatively financed.

2.5 Tools and Methods Recommendations

Risk mitigation reduces the uncertainties of project development and can be achieved through different instruments and inputs. The underlying rationale is to reduce the potential adverse effects caused by a specific risk on a project by allocating the risk to the project party best suited to achieve this result. Risk reduction not only provides increased delivery certainty, but also has a direct

relationship with the project's financial performance and cost from the DoD's perspective. The more the DoD can provide certainty and mitigate risks before projects are tendered or brought to market, the more attractive the commercial terms that are likely to be offered for projects.

Types of Risks Mitigation Tools

The construction risks evaluated by financing parties, range from risks of cost overruns to schedule delays. Inputs to reduce these risks include developing a contractual structure that has a firm-fixed price with credible contractor and liquidated damages (LD) clauses, contingency funds, retainage, and parent guarantees.

Operating risk includes performance risk, which can be a concern, especially among lenders and investors, when backing a project that uses new or unfamiliar technologies. To reduce financial sector risks surrounding performance, project lenders can require performance bonds, performance LDs, and warranties as components of the project contracts. Operating risks can be mitigated via various types of contractual agreements, partnerships, and monitoring and information sharing among the various divisions. In addition, technical tests can be performed throughout the project to ensure it is performing as expected.

The revenue risks the DoD could face when implementing energy resilience projects are a significant component of the project risk assessment for the financial industry, as it most directly impacts the quality and reliability of cash flows. Specific inputs and mitigating strategies discussed are contractual support, improving the credit quality of the offtaker, managing the fuel supply/resource risk, indexing prices to account for inflation risks, providing availability payments, and combining intermittent generation sources with storage.

Market risk mitigation tools and inputs are assessed by lenders and investors to understand how their capital is exposed to market risk. The mitigating strategies vary based on the location of the project and whether it is in a regulated or deregulated state.

Financial risk mitigation tools include establishing a debt service reserve account, applying ratio tests, and including force majeure provisions among others. Although there are some challenges to scaling up the DoD's use of third-party investment to achieve its mission of energy resilience, the market is broad and there are many creative tools and inputs to mitigate the various project risks identified by financing parties.

Key Financial Metrics to Evaluate Project Risk

The financial industry, and specifically lenders for infrastructure projects, rely on several key metrics or ratios to evaluate project risk. These key metrics provide a standardized measure that can be used to monitor and forecast performance over time.

The Debt Service Coverage Ratio (DSCR) is one of the most common metrics used by lenders to evaluate the financial capacity of energy sector projects. It aims to measure the incremental cash flows or cushion available after paying debt service (and any more senior obligation, depending on the flow of funds). Lenders will evaluate DSCRs for each payment period over the life of the loan, and check that it does not fall below contractual requirements in any given period.

Additional Bonds Tests (ABTs) are revenue tests that the project must meet to incur additional indebtedness. They are designed to prevent any degradation to the credit quality of outstanding debt in relation to a proposed debt issuance. Typically, ABTs are calculated based on past performance, but also include forward-looking evaluations.

The Loan Life Coverage Ratio (LLCR) is based on the same principle as the DSCR, but aims to measure the cash cushion in excess of debt service over the entire life of the loan. The LLCR measures solvency over a period of time. It can be used in corporate finance as well to size the amount of cash that will be available for anticipated loan issuances in the medium- to long-term.

Leverage ratios measure the respective amounts of debt and equity in a given capital structure. One of the most commonly used leverage ratios is the debt-to-equity ratio. The debt-to-equity ratio is used by lenders to understand how much equity is provided by the developers or owners. There is no real benchmark for "good" leverage ratios, but a high leverage implies that the debt service burden may result in lower DSCRs.

Return on equity (ROE) is used by equity investors to determine the expected returns on their equity investment. In its simplest form, ROE is calculated as the ratio of net income to shareholder's equity and can be analyzed in relation to the leverage ratio.

The remainder of this report presents impediments to accelerate alternative financing and lending for DoD energy resilience projects, as gleaned from industry outreach, followed by recommendations on how to overcome such impediments and increase project execution.

3 Impediments to Accelerate Alternative Financing and Lending

Challenges and roadblocks of adopting alternative financing exist for energy resilience projects. This report presents the challenges facing private parties, as told by them, that currently work with or would considering working with the DoD. Understanding these challenges allows the DoD to reduce and eliminate execution obstacles when possible. This will introduce mutual understanding between the different defense agencies, the financial community, and the developer or operator, thereby streamlining the process, shortening the timelines between project conception and financial closing, and increasing the volume of projects that employ alternative financing.

This report synthesizes findings from interviews with over fifteen private institutions active in energy development and finance that have worked with or may consider working with the DoD. The impediments voiced by alternative financing providers are summarized below.

Awareness of Project Pipelines

Investors and lenders expressed that they are often unaware of resilience projects coming to market, especially during pre-feasibility and development stages. Financiers often do not actively monitor government procurement sites such as FedBizOpps.gov, or maintain contacts with installations for information on pending projects. External lenders expressed concern that projects can be awarded to local entities with inside information on procurement timing and tenders, limiting competition and interest from qualified partners less active in day-to-day procurement screening. The DoD can address this issue through more active, frequent, and centralized sharing of information on project pipelines across all the service branches. This information sharing could include regular industry days to update financing providers and developers on timing for tenders, priority projects under development, and status of projects already tendered. Industry days would also provide a forum for interested parties to interact and form consortiums to identify and pursue resilience projects that fit their risk profiles or investment criteria.

Long-term Commitment of DoD to Resilience Projects

Some financiers raised concerns that energy resilience projects do not present an obvious path to generating cash flow, and questioned whether service branches and the DoD have a long-term commitment to resilience projects. This factor is important given that loan repayments on most projects require many years, if not decades to complete. Typical resilience projects such as backup generation, critical feeders, or microgrid enhancements do not create a cost savings or user charge to pay for added services. Financiers question whether installation decision makers will prioritize cost reductions over resilience requirements, given the absence of clearly defined resilience goals across all service branches. Lenders in particular provided anecdotal examples of resilience projects that were postponed or canceled after considerable time and procurement effort because of their added costs or lack of clear savings potential. Ideas to mitigate this concern included setting clear resilience targets or goals, such as availability requirements, having availability payments that are sufficient to cover debt service and fixed operating costs, combining energy resilience projects with projects that produce energy savings and returns, or providing grant funding to lower the risk profile of projects for private parties.

Project Pipeline Regularity and Project Size

Lenders and investors raised concerns regarding the infrequency and regularity of projects coming to the market that ultimately reach financial close. This infrequency causes financial parties to shift their resources to other markets and opportunities, despite clear interest in DoD energy

resilience opportunities. One lender revealed that because the entire market of DoD energy projects is so limited and inconsistent, larger institutions refrain from entering the market, as the probability of closing successful projects does not match the effort it takes to learn and remain engaged in the market. Similar concerns were raised regarding service branch projects announced for tender that subsequently are canceled or delayed for extended periods. These cancellations reduce confidence that other projects have the political and institutional support to reach closing.

Furthermore, projects are often too small to reach the underwriting targets of major lenders and institutional investors, which focus on financing opportunities exceeding $100 million per transaction (an active middle market also exists for financings between $25 million and $100 million, whereas the small transaction financing market is more limited). Larger projects are preferred to maximize tax equity benefits, to attract a greater number of potential financial partners, and to justify investments of time and resources to pursue opportunities. The DoD has the opportunity to shape the market for financing energy resilience projects through combining projects, by region, technology, authority, or other similar complimentary factors. Regional projects could potentially be combined across service branches or tendered in groups to a single qualified developer responsible for securing a larger overall funding commitment.

Lengthy Procurement Cycles and Timelines to Closings

Multiple interviewees expressed the length of time to get from the start of project development to the award of a task order and financial closing is too long. This length of time can increase uncertainty and risk while reducing lender interest in subsequent projects. Interviewees that have participated in ESPCs said that on the short end, pre-solicitation to commercial completion can often take two years or longer, while some projects can take four years or longer. Another interviewee that has participated in UP transactions reported that projects take three to four years on average, with the maximum it has experienced being eight years.

Interviewees expressed that they believe the cause of the significant time taken is due to DoD's internal approval process. On this point, some services received more positive feedback. Several financiers reported that the Navy Energy Security Programs Office (ESPO) leads a more effective tendering and project development process, with a higher probability of transactions ultimately closing. Due to ESPO's efficiency, interviewees suggested the Navy share best practices with the Army Office of Energy Initiatives (OEI) and the Air Force Office of Energy Assurance (OEA), such that they could learn from each other's experiences.

Understanding Regarding Different Alternative Financing Authorities

Project execution expertise varies across the service branches. Some project execution offices or installations have more individual and organizational experience, resulting in better success. This inconsistency across installations increases uncertainty for developers and their financial partners, and is a barrier to entry. In addition, contracting officers' experience and familiarity with certain contract vehicles also contribute to this uncertainty.

As an example, interviewees have seen installations attempt to use ESPCs or Energy as a Service (EaaS) for projects that may not be best executed through those vehicles. The financiers believe that, at times, installations are under the impression that they must try to use such vehicles at all costs, when the economic and financial components of the project may indicate a different vehicle would be more optimal. Related, the same financiers believe that limitations on mixing funding

from different authorities, such as mixing appropriated dollars with private financing on a project, are creating roadblocks and restrictions to effective project structuring.

Importance of Standardized Contract Terms and Conditions

Several large lenders reported that standardizing contract terms across all DoD procurement offices and service branches, utilizing language consistent with acceptable market terms, would lead to increased interest in alternative financing across the lender and investor community. Specific contract language examples for standardization include termination for convenience (TforC) and termination for default (TforD) language and force majeure provisions. While some lenders conveyed discomfort with any TforC language in project contracts, others reported that the financial markets will accept this risk if the language is consistently applied and reflects generally accepted market terms.

Lenders indicated that TforC and TforD provisions are a common requirement for non-DoD public infrastructure projects, citing numerous public-private university energy utility projects as examples. DoD contracting agencies would benefit from reviewing and applying the TforC and TforD language applied consistently in these successful public-private energy financings, using this language as a best practice applied to DoD resilience projects. Similarly, lenders recommended that contract templates be used consistently by the U.S. Army Corps of Engineers (USACE), DLA, and DOE contracting offices. Their experience has been that these agencies apply different terms and conditions, as do individual service branches, which leads to extensive delays and potentially cancellations of contracts during the procurement cycle. Lenders also indicated they would be more willing to invest time in DoD energy resilience opportunities if standard TforD language allowed for sufficient step-in rights and cure periods, in the rare instances where a developer or operator does not meet performance requirements. The lender risk is much greater for projects without market-acceptable terms for cure provisions in the event of performance shortfalls for ongoing projects.

Limited interviewees raised concerns about payment delays they had experienced on installation energy projects. They recommended escrow accounts or similar mechanisms be made available to counter frequent 15-30 day late payments by DoD payment agencies, as late payments add risk and require additional collection resources to mitigate. Delinquency limits the number of lenders who can work with the DoD, as smaller lenders cannot afford to have significant amounts of delinquent loans on their balance sheets.

Constraints on Foreign Involvement in DoD Projects

Several interviewees expressed concern around limitations in financing DoD projects through foreign investors, lenders, or institutional/pension investors. This is a concern because institutional investors, sovereign funds, and international banks are among the most active and aggressive financiers of mid-sized and large infrastructure projects, including in the U.S. Lenders often look to resell their loans or financings to secondary investors, such as following construction phases upon commencement of regular cash flow payments. Limitations on the ability to resell financings to secondary investors, including foreign institutions, ultimately limits the pool of available capital to finance resilience projects and can lead to higher long-term financing costs paid by the DoD or service branch.

4 Risk Rating Tool Overview

The existence of perceived impediments by the private sector in working with the DoD illustrates a disconnect between DoD and private sector perspectives in executing energy projects. Part of this relates to differences in how the two parties perceive risk. To aid the DoD in overcoming this gap, Deloitte developed a Risk Rating Tool as part of this report. The tool is designed to be flexible between alternative financing authorities, such as EULs, PPAs, ESPCs, and UESCs. It has two main components: a risk rating analysis and a high-level financial analysis. The purpose of the Risk Rating Tool is to help the DoD evaluate energy resilience project risks from a private developer or lender's perspective to better understand: a) if alternative financing is a viable option for the project; b) the key risks that affect the project's suitability for alternative financing, and c) how a third party would likely evaluate the specific risks of the project under development.

Risk Ratings

The risk ratings aspect of the tool helps the DoD assess each individual risk component that can impact the project's financial viability. These risks are based on the methodologies that agencies such as Standard & Poor's (S&P) Global Ratings, Moody's Investor Services, Fitch Ratings, and DBRS use to assign credit ratings for power sector projects.

The inputs for the risk ratings are individual scores for each risk aspect. These include:

- **Construction**: Technical complexity, technology, contractual structure, contractor, sponsor, and permitting/approval risks;
- **Financing**: Debt structure and sufficiency of debt service coverage;
- **Operations**: Operator, cost, supply, and technology risks;
- **Revenue**: Revenue profile, counterparty, and cost risks;
- **Regulatory**: Cybersecurity, environmental, and subsidy risks; and
- **Resilience**: Physical security, threat of damage, and information sharing risks.

Each risk aspect is scored and the individual aspects are weighted to provide an overall risk rating and ratings for each sub-risk. This output provides the DoD with an overall picture of the project risks. It also helps the DoD hone in on specific risks that may either deter private sector participants, or increase the costs of alternative financing because debt and equity providers will require higher returns in exchange for bearing higher project-related risks for their financing. By identifying these risks, the DoD can then consider ways to mitigate or reallocate them to lower project costs and attract more private sector interest.

Financial Analysis

The second part of the tool is a high-level financial analysis that examines the expected costs and revenues over the life of the project. This helps the DoD assess whether a given energy resilience project is commercially viable. The factors that determine commercial viability include whether project cash flows or revenues are sufficient to cover construction and operating costs, service project debt, and provide a suitable rate of return to investors.

Deloitte's interviews with lenders and developers illustrated some best practices in the private sector for information used to conduct financial analysis of energy projects. Common key inputs for financial analysis include:

- Information about the project life, including the total project duration, expected construction length, and how long the project will be operating;
- How much of the project will be funded through debt and equity, and the required rate of return (e.g., interest rate) for each form of capital;
- Requirements such as minimum DSCRs typically required by lenders on comparable energy sector non-recourse finance loans;
- Project specific costs, including construction, fixed and variable O&M, and major maintenance costs; and
- Revenues and/or savings (in the case of ESPCs).

Because the tool is designed to accommodate multiple alternative financing authorities, the inputs are structured to be flexible for multiple project scenarios. These inputs are intended to be populated once the DoD has a defined project, and to aid in negotiations with project developers and their financing parties.

The key outputs of the financial analysis include a summary of whether the project cash flows are sufficient to cover construction, ongoing O&M, major maintenance, and debt service costs over the life of the project. The financial analysis also calculates expected returns to equity providers, which serves as an indication of whether the project would be attractive to private developers (i.e., whether the project would provide high enough returns to justify their investment).

These outputs help the DoD identify potential problems with the project's commercial viability.

5 Recommendations on how to Accelerate Alternative Financing

This section discusses recommendations to the DoD on accelerating alternative financing for increased awareness, throughput, and execution of alternative energy resilience projects.

5.1 Create a Center of Excellence for DoD Energy Resilience Projects

Currently, energy resilience projects undergo development and formation at installations, with support from service branch installation energy offices. Projects are often developed in silos based on individual installation experiences and knowledge of different contracting authorities. Financial parties (and developers, ESCOs, others) have limited awareness of project pipelines, and lack the resources or willingness to meet with individual installations or actively track government procurement websites. Limited information is circulated to the financial and developer community on successful project closings and completions, which feeds perceptions that few defense sector resilience projects are coming to market and reaching operating phases.

Developers and their financial partners report significantly different experiences working with various installations and contracting offices in terms of proficiency, approval processes, and timeliness. These differences also vary within and between agencies. As examples, TforC language in contracts can differ from branch to branch and within individual contracts. Specific contracting officers have comfort levels with certain terms and conditions that other contracting officers may not accept or may remove, despite their acceptance on other project contracts. These differences are compounded by the fact that installations and service branches are familiar with and are prone to use certain contracting authorities over others. Multiple commercial parties reported challenges in securing awards for UP contracts, as an example, especially outside of the Army. A lack of consistency creates challenges in working with service branches and installations.

A Center of Excellence can coordinate with internal and external stakeholders related to alternative financing of energy resilience projects. Key stakeholders within the DoD include the installation energy managers, installation commanders, and service-level installation energy offices. Key external stakeholders include project developers, ESCOs, lenders, bankers, and other project financiers. Primary functions of the Center can include sharing of project pipelines through industry days and regular briefings, providing details and best practices within and outside of DoD, reporting on successful progress and completion of energy resilience projects, analyzing and identifying policy reforms to create new financing authorities and tools, monitoring and evaluation of metrics related to energy resilience projects, and communication of tools and resources across service branches and installations. This Center could include staff with capabilities in business process improvement, training, project development, and communications, with past experience in or exposure to finance. These different capabilities will complement the policy and advocacy role currently performed by ODASD(Energy).

Establish Consistency and Transparency to Accelerate Project Financing

At its core function, the Center of Excellence would collect and coordinate information related to project pipelines and best practices across pending and successful energy resilience projects, while increasing transparency and coordination among the public and private sector entities involved in project development. The Center could work with stakeholders relevant to energy resilience projects to create a more robust marketplace that matches resilience projects with appropriate alternative financing. Beneficial outcomes of this coordinating function will include improved

project quality, a more transparent pipeline of pending and current projects across all service branches, expanded knowledge and understanding within the DoD of leading practices and commercial rationale of alternative financing sources, and increased competition for financing through attracting an increased pool of lenders and investors seeking roles in energy resilience projects.

The Center of Excellence will coordinate information sharing across the service branches and seek to bring consistency across contract terms, tender cycles, and development for resilience projects requiring alternative financing. The Center's objectives would differ from the DOE's FEMP and other existing energy programs by focusing solely on infrastructure projects to achieve DoD and service branch resilience requirements. For example, while current lenders on ESPCs and other DoD energy contracts indicated an acceptance of TforC clauses, all parties indicated that the specific language for termination is negotiated afresh with each contract. The Center of Excellence can address these issues through policy and procedures guidance on standardized contract language and terms on all installation energy projects, including TforC language. This consistency will increase the pool of available financing parties, and reduce delays and roadblocks in negotiating specific contract terms.

A key effort of a Center of Excellence would be to share across service branches knowledge and understanding of best practices related to development and financing of energy resilience projects. Sharing knowledge from different installation energy managers, installation commanders, and service level installation energy offices will allow the DoD to more consistently identify trends, accelerators, and obstacles to getting these energy resilience projects to financial close. While platforms such as Energy Exchange and FEMP strive to share knowledge on successful projects, institutional knowledge transfer is anecdotal and often lost when participants rotate between billets, are reassigned to new duty stations, or leave the DoD. As hurdles or obstacles are identified in the project development cycle, the Center of Excellence can develop tools, checklists, templates or other resources that streamline approval processes, coordinating inputs and recommendations from inside and outside of DoD. These tools can lead to increased confidence in the cost, schedule, delivery, and management of the projects.

The Center can also provide tools related to combining projects. As a central repository that receives information on energy resilience projects across multiple service branches and geographic locations, similar projects can more easily be identified for combining. As indicated in multiple interviews, greater numbers of lenders and financial institutions are likely to participate in markets involving a steady stream of consistent project opportunities coming to market, or involving a portfolio of similar projects where project diversification can mitigate the risk of any one individual project. The efficiencies from combining are driven by similarities in risk profiles, which can yield an expedited project delivery from the shortened contractual process for combined projects.

External Value to DoD

The primary value of the Center of Excellence to those outside of DoD is to increase coordination with external stakeholders – project developers, operators and services companies, financiers, banks, and others who work on energy resilience projects. These external stakeholders must currently go directly to individual service branches and installations, or actively follow government websites to try to gather information on energy project pipelines. They often chose to forego these efforts rather than to invest in understanding the energy resilience market and future

project finance opportunities. A Center of Excellence would increase visibility and allow for outside stakeholders to learn more about DoD's approach to energy resilience projects, project pipelines, successful methods to partner with DoD on these projects, and resources available to more quickly close the projects.

The Center can also serve as a validating tool to signal to external stakeholders that specific projects are prioritized within the DoD, and that resilience remains an overall DoD priority area, alongside energy efficiency and other factors. Interviews with lenders and developers expressed the need for DoD to take action to assure the private sector about the long-term commitment to energy resilience goals and projects. The current absence of a consistent message to the private sector reduces their likelihood of engagement with defense energy resilience projects.

This Center can engage the private sector by showing why it is useful to use the tools and resources available to align the energy resilience projects with alternative financing. Clearly communicating about available tools and resources and how they are useful can open the defense energy resilience marketplace from a small number of entities that have overcome initial barriers to entry to more robust competition. Reducing bureaucracy and increasing ease of use should be incorporated into the tools and resources that the Center develops and promotes. Overall, improved communication between DoD and industry will help reduce the bureaucratic hurdles.

The implementation of the Center of Excellence can yield the achievement of the DoD's goal to increase the number of energy resilience projects that access alternative financing by increasing the transparency of project terms and closing process. Offering a more robust project pipeline and forecasting of projects will provide more long-term details to developers and lenders which will yield increased confidence in the project development process. Investors have expressed that they would have greater interest in financing DoD projects if there is more consistent deal flow in the project pipeline.

The implementation of the Center can yield the achievement of the DoD's goal to increase the number of energy resilience projects that access alternative financing by increasing the transparency of project terms and closing processes. Offering a more robust project pipeline and forecasting of projects, communicated through industry days and other regular forums, will provide more long-term details to developers and lenders which will yield increased confidence in the project development process. Increased transparency and more readily available information will increase competition among current and new project developers, including small business participants. This competition will ultimately provide better value to the federal government and DoD for these projects.

5.2 Establish an Energy Resilience Goal

Congress has made energy resilience a priority, and the DoD needs to execute in accordance with that objective. Creating a clearly-defined energy resilience goal allows the DoD to standardize resilience expectations and create leverage to allow services to pursue energy resilience initiatives. Deloitte recommends that OSD establishes a clear process within the DoD to develop an energy resilience goal to:

- Improve critical mission readiness and continuity of operations;
- Reduce disruptions to energy systems; and

- Enhance national security.

Deloitte envisions the Center of Excellence to communicate this energy resilience goal and monitor progress towards its achievement at the service branch level. The energy resilience goal should endeavor to align incentives for the installation level commanders, the services, and OSD.

Providing Internal Direction and Impetus

Establishing an energy resilience goal creates a uniform expectation of performance across the DoD and service branches. Currently, service branches and installations approach energy resilience to achieve different objectives and requirements, placing different points of emphasis on tools and authorities used to execute energy resilience projects. While flexibility in allowing for mission owners to choose authorities and project structures to achieve resilience is beneficial, this flexibility can be retained through a DoD-wide goal. A goal sets the expectation that all mission-critical assets will achieve a minimum level of resilience, as articulated in IEPs, while allowing mission owners to define their own path towards meeting the goal.

In addition to level setting, an energy resilience goal provides a concrete target for services and installations to achieve. This has benefits regarding motivation as well as measurement and verification. The existence of a goal incentivizes action toward a specific desired outcome; without it, installation energy stakeholders may still work towards energy resilience, but perhaps in ways that are not supportive of broader DoD requirements and priorities. A well-defined goal also allows for progress to be easily measured, and achievement to be verified.

Creating Leverage and Enabling Project Execution

Establishing an energy resilience goal sends a clear message that, for energy resilience projects, achieving prescribed levels of resilience performance, such as availability, takes higher priority than potential cost savings. Currently, appropriation decisions for resilience projects are focused on potential cost savings as much as or more than on resilience requirements. However, many types of priority energy resilience projects do not generate a financial return in the form of additional revenue or cost savings, but are nonetheless essential to achieving mission readiness and minimizing threats to installation energy systems. An energy resilience goal will help all parties understand that resilience projects are a strategic priority for the DoD, regardless of whether they generate a minimum Savings to Investment Ratio or other cost saving requirement.

With this in mind, OSD can use an energy resilience goal as justification to advocate for the allocation of internal funds towards achieving the resiliency goal. Available federal funding for installation resilience projects is limited and shrinking. An energy resilience goal would create an impetus towards dedicating more appropriated funds or creatively using other funding and financing mechanisms for energy resilience purposes.

To enable efficient monitoring and evaluation, aspects related to the energy resilience goal can be incorporated into IEPs. The DoD and service branches are in the early stages of incorporating energy resilience requirements into specific IEPs. Incorporating specific resilience goals and targets into IEPs would increase visibility and tracking of progress on the success or failure of the installation resilience plans.

Increasing Alternative Financing of Energy Resilience Projects

Effectively communicating this message to all stakeholders would also make it easier for DoD components to engage the financial industry to attract alternative financing for energy resilience

projects. The private sector has voiced concerns around how energy resilience projects will be executed by the DoD, if there is no obvious path to cost savings. Individual services or the DLA can use the goal to show financiers and developers that energy resilience projects are part of a strategic initiative by the DoD that is a priority to the Department. An energy resilience goal also increases transparency and investor confidence in a pipeline of future projects, with continuous deal flow.

Mission owners can use the energy resilience goal to develop more detailed energy resilience metrics and requirements for specific projects. This will then allow installations or services to go to market and ask developers to compete to provide the best-value solution that achieves the required level of resilience. This is a technology-agnostic way of getting to the most cost-effective approach to achieving energy resilience which transfers the responsibility of deriving a technology architecture to the developers.

5.2.1 Considerations for Establishing an Energy Resilience Goal

An energy resilience goal should be closely tied to existing policies and definitions for energy resilience. Per title 10 U.S.C. § 101(e)(6), energy resilience is defined as:

> "the ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated energy disruptions in order to ensure energy availability and reliability sufficient to provide for mission assurance and readiness, including task critical assets and other mission essential operations related to readiness, and to execute or rapidly reestablish mission essential requirements."

Based on this definition, the essence of energy resilience is the availability and reliability of energy for mission-critical assets. As such, before an energy resilience goal can be applied, the DoD must first be satisfied with its definition of criticality and its designation as to which assets are considered mission critical.

The energy resilience goal should be one that can be applied across all DoD agencies and installations, and that can be clearly understood, applied, and monitored. Ultimately, each DoD installation and mission owner should be able to create its own plan to achieve the goal. The goal is not intended as a one-size-fits-all prescription uniformly imposed on mission owners. In practice, achieving energy resilience would look different from mission to mission and base to base, depending on mission-specific requirements, location of critical assets, and differences in the functions of installations. Hence it is essential that the goal provides sufficient flexibility such that it can be achieved while allowing for differences in operational considerations.

5.2.2 What an Energy Resilience Goal May Look Like

An energy resilience goal can take different forms. For all types of goals, a similar process can be followed to determine and establish the goal. The process would start with deciding on the measurement needed for the goal. This would then enable a baselining process in which the current performance of that measurement can be determined. Along with understanding the current state, a targeted performance level would also need to be established using the same measurement. Then, the gap between current performance and targeted performance can be derived. Only once the performance gap is understood and clearly laid out can a plan be made to close the gap. These monitoring and evaluation efforts can be performed by staff in the Center of Excellence, informing the tools and resources developed that complement and support achievement of the goal.

Regardless of the form that an energy resilience goal takes, the goal should aid the DoD in achieving national security and mission continuity targets. To that end, processes need to be developed to embed the goal in various aspects of DoD operations. For example, the goal could be included in the ERCIP program as a criteria of project submission. The goal could also be included in Solicitation Requests for Proposal (RFP) and contract awards for energy resilience projects.

Table 3 below summarizes different alternatives for setting an energy resilience goal that are available to the OSD. These options are described and explained in more detail in the following subsections.

Table 3: Examples of Energy Resilience Goal Options

Goal Category	Goal Type	Goal Example
Financial	Alternative financing	a) Defined target for alternative financing investment dollars to be sought to achieve resilience requirements b) Percentage of resilience gaps closed
Operational	Availability	Percentage of time that mission critical installation assets are available, including black start response time.
	Duration	Duration of operations of mission-critical assets that backup generation options should power in the event of a grid outage.
Organizational	DoD Procedures	Information to be collected on installation performance regarding energy resilience

5.2.3 Financial Goal Example

A financial goal for energy resilience goal could be focused on increasing alternative financing, in the form of a dollar amount of funding to be secured or a percentage of resilience gaps closed through alternative financing. Such a goal would be based on the OSD's expectations for the value of energy resilience projects needed to close resilience gaps. The value of such a goal is to identify and prioritize alternative financing as a mechanism for executing energy resilience projects, alongside appropriated funding. Having such a goal demonstrates to the private sector that the DoD recognizes the need for alternative financing for energy resilience projects. This makes it more likely that there will be a consistent high volume of deal flow originating from the DoD, addressing a concern voiced by the private sector during our interviews.

5.2.4 Operational Goal Example

An energy resilience goal could also take the form of an operational goal, which may be measured by availability or by the response time of backup generation assets. For availability, the goal could be to identify the percentage of time that mission critical assets across the DoD are adequately powered in the year. This goal would minimize the downtime of any assets, which follows the definition of energy resilience in title 10 U.S.C. § 101(e)(6) in that it serves to avoid and minimize energy disruptions. For backup generation, it may be number of days of backup generation that should be available at all times for critical missions, or the response time from black start to return power to mission-critical functions. Currently, Navy and Army already have goals for availability

of backup power,[6] which OSD may wish to reference in deciding a service-wide goal. Such a goal would promote the ability to prepare for and recover from unanticipated energy disruptions, also key tenets in the definition of energy resilience.

For an operational energy resilience goal, DoD should start by deciding what metrics it wants to measure. Examples presented above include availability and backup generation. Once it has decided on an acceptable metric or target, it should start by establishing a baseline of current performance. Only by having a comprehensive understanding of existing operations can a goal be set and performance be measured. After a baseline has been established, a decision must be made on what the target should be. This can be ascertained by reviewing existing standards or benchmarks adopted by services as well as commercial and utility industry best practices. Part of the consideration of the target should also include a projected timeline for meeting the target. While it is important to set a target that actually achieves energy resilience, if baseline performance is far from the target, then realistically it will take time for the target to be achieved. A roadmap must be laid out for steps that need to be taken by all stakeholders to achieve the operational target.

5.2.5 Organizational Goal Example

An energy resilience goal can also be organizational. An organizational goal can take many forms, but the principle of such a goal is that it would consist of a change to current processes and procedures in a way that establishes an emphasis on energy resilience. For example, a goal could be to set reporting requirements for all installations to report energy resilience requirements and current performance to meet the requirements. The purpose of the goal would be to effect improved planning, monitoring, and evaluation of energy resilience at the installation level.

Such a requirement is already present in title 10 U.S.C. § 2925(a)(4), which states that in future Annual Energy Management and Resilience Reports (AEMRRs), the DoD will report on energy resilience and emergency backup systems serving critical energy requirements at a minimum:

- (A) Energy resilience and emergency backup systems power requirements;
- (B) Critical missions, facility, or facilities serviced;
- (C) System service life;
- (D) Capital, operations, maintenance, and testing costs; and
- (E) Other information the Secretary determines necessary.

Enforcement of these requirements may constitute the energy resilience goal. Having an organizational energy resilience goal enables the DoD to have a more accurate and comprehensive understanding of its energy resilience capabilities and requirements across all services and installations. This would ensure it can be more definitive about the types of projects to execute and the reporting requirements to ask for when interfacing with private parties for alternatively-financed energy resilience projects.

For an organizational energy resilience goal, the first step would again be for OSD to establish what type of procedure and what requirements to impose on the services and on installations. This may be what is currently written in title 10 U.S.C. § 2925(a)(4), or it may be other requirements

[6] 14 days for the Army (Army Directive 2017-07), 7 days for the Navy (Installation Energy Security Framework P-602, June 2017)

that the OSD would like to see through IEPs or other submissions. A baseline would then be established as to what procedures the installations are already following and what information already gets reported. This is likely to vary from installation to installation. Once the information gap is determined, a plan can then be made for closing that gap. Depending on the nature of the goal, the plan may consist of information gathering and reporting requirements; it may also consist of new procedures that add an energy resilience component to existing programs.

5.3 Create the Defense Energy Resilience Bank (DERB)

The DoD can accelerate alternative financing through creation of a Defense Energy Resilience Bank (DERB). Deloitte recommends that the DERB structure include the strengths and best elements of a centralized financing platform, and from existing federal direct financial support programs to support other public infrastructure priorities, especially existing Transportation Infrastructure Finance and Innovation Act (TIFIA) and Water Infrastructure Finance and Innovation Act (WIFIA) programs. The design of the DERB can learn from and incorporate effective formats and features from other federal lending and credit guarantee programs in practice across the federal government that successfully foster private sector investment to support public infrastructure requirements.

5.3.1 Centralized Financing Platform

A centralized financing platform can mobilize the convening and coordinating power of the DoD to collect and share project-specific information, tools, technical assistance, best practices, and access to financing resources across energy resilience projects. If combined with the Center of Excellence proposed in Section 5.1, heightened coordination among the service branches and installations with the use of a centralized financing platform will better and more quickly direct financing sources to projects needing alternative financing. This will reduce instances where developers and financial partners cannot locate access to project information and deadlines, or are unaware of projects coming to market and therefore do not participate in their tender and award.

Improved communication and transparent identification of resources available to support project development are key elements of a successful financing platform. Project development life-cycles can be shortened via improved access to possible technical assistance, financing guarantees, or private capital resources that may otherwise be disconnected from priority resilience projects. Increased communication with project developers, lenders, and financiers will increase knowledge of projects and processes that are unique to working on energy resiliency projects within the DoD.

The Power Africa Initiative profiled here is a successful financing platform that could be modified for DoD resilience projects. While Power Africa does not directly lend or invest in energy projects, the initiative has secured additional commitments from private capital resources to support priority energy generation projects. Power Africa also serves a convening role by directing

Case Study: Power Africa Initiative

Power Africa is a U.S government platform coordinated through USAID to mobilize financing and technical assistance to address energy deficiencies across sub-Saharan Africa. Power Africa mobilizes financing from U.S. government agencies and the private sector, combined with technical assistance, to accelerate priority energy projects towards financial close and construction.

A core focus of Power Africa is to identify and advance energy projects that would be bankable or commercially viable, with the addition of certain technical support or risk mitigation measures. Since 2013, Power Africa has leveraged $7 billion in public sector financial commitments to mobilize an additional $20 billion in private sector funding commitments for African energy projects.

viable projects seeking funding to qualified developers, investors, and banks.

5.3.2 Federal Lending and Credit Guarantee Programs

The centralized platform can be supplemented by a DoD-specific lending or credit guarantee program for energy resilience projects. There are existing programs across the U.S. government that can serve as models for the financing program that the DERB will take. Deloitte recommends DoD actively pursue the legislative authority and appropriations to create a credit guarantee program.

Table 4: Summary of Federal Lending and Credit Guarantee Programs

Agency	Program	Support Facility	Lifetime Amount of Completed Projects (as of FY 2018)[7]
U.S. Department of Transportation	Transportation Infrastructure Finance and Innovation Act program (TIFIA)	Credit Subsidy	$117 billion
U.S. Department of Transportation	Railroad Rehabilitation and Improvement Financing program (RRIF)	Credit Subsidy	$5.9 billion
U.S. Environmental Protection Agency	Water Infrastructure Finance and Innovation Act program (WIFIA)	Credit Subsidy	$1.6 billion
U.S. Department of Energy	Title 17 Loan Guarantee Program	Loan Guarantees	$16 billion
U.S. Agency for International Development	Development Credit Authority (DCA)	Partial Credit Guarantees	$5.5 billion
Overseas Private Investment Corporation	OPIC Medium to Long Term Debt Financing OPIC Political Risk Insurance	Debt Financing Political Risk Insurance	$3.84 billion (private capital mobilized in FY 2018)
U.S. International Development Finance Corporation	To Be Determined (Will be operational by end of 2019)	Loans Equity Investments	TBD
Export-Import Bank of the United States	Medium- and Long-Term Guarantees Credit Guarantee Facility Program Export Credit Insurance	Loan Guarantees Risk Insurance	$6.8 billion (export sales supported in FY 2018)

5.3.2.1 Existing USG Credit Subsidy Programs

[7] From Congressional Research Service reports and Agency FY 2018 Annual Reports

The DOT, through its TIFIA and RRIF programs, and the EPA, through its WIFIA program, provide examples of potential alternative funding sources that successfully attract increased third-party capital flows and efficiently leverage federal appropriation dollars. These programs aim to leverage federal funds to stimulate private involvement and investments in transportation and water infrastructure projects deemed essential to the national interest.

The Build America Bureau is responsible for driving transportation infrastructure development projects in the U.S. and includes the TIFIA and RRIF programs. The Bureau streamlines credit opportunities and grants and provides access to the credit and grant programs with more speed and transparency, while also providing technical assistance and encouraging innovative best practices in project planning, financing, delivery, and monitoring. The Build America Bureau offers one potential model for the DERB, building on the Center of Excellence discussed in Section 5.1.

Congress appropriates funds for the TIFIA, RRIF, and WIFIA programs. Individual project sponsors or developers apply for Credit Subsidy Programs assistance, typically as direct loans, within the requirements of each program (e.g., TIFIA cannot provide more than 33 percent of project costs). Based on the program underwriters' assessment of project risks, the Credit Subsidy Programs determine a "credit subsidy." The credit subsidy represents the expected credit losses for the type of asset the project aims to develop. Typically, for transportation projects, the credit subsidy is below 10 percent of the proposed loan amount and for water projects the credit subsidy is below 3 percent of the proposed loan amount. The Credit Subsidy Programs deposit the credit subsidy taken out of the authorized money pool as collateral and borrow the loan amount from the U.S. Treasury. The loan is then issued to the project sponsors or developers who then pay debt service on the outstanding loan until full repayment. The debt service received by the programs is the flow of funds used to pay back the U.S. Treasury.

The structure adopted by the Credit Subsidy Programs allow for an initial public funding to be leveraged multiple times in terms of infrastructure investments. Most of the financing on these approved projects still relies on private capital, but Credit Subsidy Programs act as anchor lenders providing low-cost debt financing. One dollar of TIFIA authorization can be leveraged to provide up to ten dollars of loan. Given the restrictions on this financing (i.e., TIFIA financing must be less than 33 percent of the project costs), there is the opportunity for significant amounts of leverage. These loan programs are successful when they involve projects with a clearly defined revenue stream that provides the source of loan repayment.

In applying this example to DoD energy resiliency projects, a structure similar to the Credit Subsidy Programs mechanisms would only be applicable to projects with a clear revenue or repayment stream. To be eligible for a credit subsidy program, a project sponsor must be deemed creditworthy and must have a dedicated source of revenue for repayment. To ensure creditworthiness, TIFIA or WIFIA loans must receive investment grade ratings from at least two nationally recognized credit rating agencies. The dedicated funding mechanism is either a new user fee or tax or the repurposing of existing fees and taxes. The projects selected must already be creditworthy and have a lower risk. The benefit from the credit subsidy program is accelerated project delivery and leveraging low-cost federal assistance to larger capacity.

5.3.2.2 Existing USG Loan Guarantee Programs

The DOE provides loan guarantees through the Title 17 Innovative Energy Loan Guarantee Program. The DOE Loan Programs Office (LPO) has more than $40 billion in loans and loan guarantees available to help deploy large-scale energy infrastructure projects in the U.S. Over the

past decade, LPO has closed more than $30 billion of deals across a variety of energy sectors. Title 17 loan programs were established to bridge the gap in funding for the initial commercial deployment of new energy technology by financing the first deployments of a new technology to bridge the gap for commercial lenders. Once the technology is proven at commercial scale through the first few projects, DOE exits and private lenders provide the financing.

For more market-friendly technology and projects as assessed by the Risk Rating Tool and other metrics, DERB financing can play this role of financing initial projects, shepherding them to commercial viability. Once the initial projects succeed, the market can take advantage of the tools and resources available via the centralized platform to successfully close these projects with alternative financing sources.

The DOE Title 17 Innovative Energy Loan Guarantee Program is a contract between the federal government, private creditors, and a borrower that the federal government will cover some or all of the borrower's debt obligation if the borrower defaults. DOE guarantees up to the full amount of the loan amount; many of the guarantee programs discussed in the next section only provide a partial guarantee.

5.3.2.3 USG International Development Funding

The USAID Development Credit Authority (DCA), the Overseas Private Investment Corporation (OPIC), and the Export-Import Bank of the United States (EXIM) provide international development funding and overseas investment support to private sector companies investing in energy and infrastructure projects in higher risk markets. These agencies employ financing tools that demonstrate how government-backed credit guarantees can crowd in or attract additional private sector funding for infrastructure projects that may otherwise be unable to secure investment on purely commercial terms. These guarantee facilities are relevant examples where DERB financing could accelerate resilience projects with higher risk elements (e.g., less creditworthy offtaker, lower returns on investment, less stable cash flows that may not qualify for conventional commercial financing).

USAID DCA uses risk-sharing agreements to mobilize local private lending to fill the financing gap where projects lack commercial viability on their own merit. DCA offers different types of partial credit guarantees to cover potential losses for local lenders in the event of a loan default, thereby reducing the credit risk of a project. These partial credit guarantees are designed for risk mitigation and to demonstrate the long-term commercial viability of lending to less established borrowers. DCA guarantees are similar to domestic loan guarantees provided by the U.S. Small Business Administration.

DCA guarantees insure loan losses for up to 50% of loan principal on qualified credits. DCA does not directly lend money or commit funds to a project; therefore, the guarantee structure allows USAID to leverage and attract new private funding for infrastructure projects without a direct funding outlay. These credit guarantees may also be paired with technical assistance projects from USAID or other donors that focus on strengthening the borrower's ability to pay and strengthening the lending institution's capacity to work in a new sector.

OPIC helps U.S. businesses invest in international infrastructure projects by providing loan guarantees to assist those businesses in better managing risks related to foreign direct investment. OPIC complements the private sector by providing financing in countries where conventional financial institutions often are reluctant or unable to lend. OPIC provides project financing

guarantees, insuring against the business and political risks of investing abroad. OPIC charges market-based fees for its products and operates on a self-sustaining basis at no net cost to taxpayers. OPIC supports investment funds through debt financing and generally does not provide technical assistance. In FY 2017, OPIC reported authorizing $3.8 billion in new commitments for 112 projects, and its exposure reached a record high of $23.2 billion.[8]

As a result of the 2018 Better Utilization of Investments Leading to Development (BUILD) Act, the USAID DCA and OPIC, and other development agencies will be consolidated into the U.S. International Development Finance Corporation (DFC). The DFC is a new $60 billion U.S. government overseas investment agency and is expected to be operational by the end of 2019. The DFC will offer loan products, loan guarantees, and equity investments.

The EXIM is the official export credit agency of the U.S., focused on facilitating the export of U.S. goods and services. EXIM's Working Capital Loan Guarantee provides up to a 90 percent guarantee to the exporters' bank, serving as insurance for the repayment of a working capital loan. These working capital loans often cover labor, materials, and other necessary inputs for fulfilling export orders. EXIM's Export Credit Insurance protects against nonpayment risk, provides access to working capital, and extends credit to qualified foreign buyers. Additionally, EXIM offers options for flexible project and structured financing with repayment terms as long as 18 years, depending on the technology.

The DERB can develop tools modeled after one or more of the operational financing programs discussed in this section. These programs leverage limited federal funding to access larger amounts of private capital to support energy and infrastructure projects. These programs serve as replicable and adoptable models for development of a similar program within the defense sector to close the financing gap in support of resilience projects.

5.3.3 Recommended Features of the DERB

Deloitte recommends that the TIFIA and WIFIA alternative financing programs serve as models for the creation of the DERB. Both programs successfully deploy federal appropriation dollars to leverage greater amounts of alternative financing by reducing perceived project risks or default rates. In essence, these programs improve the bankability of government infrastructure projects, leading to increased alternative funding levels. As the initial capitalization and default rate for the DERB have not been determined,

Table 5 provides potential funding scenarios for the DERB with illustrative default percentages utilized by WIFIA (1%), TIFIA (8%), and a hypothetical 25% rate.

[8] Congressional Research Service. "OPIC, USAID, and Proposed Development Finance Reorganization." https://fas.org/sgp/crs/row/R45180.pdf

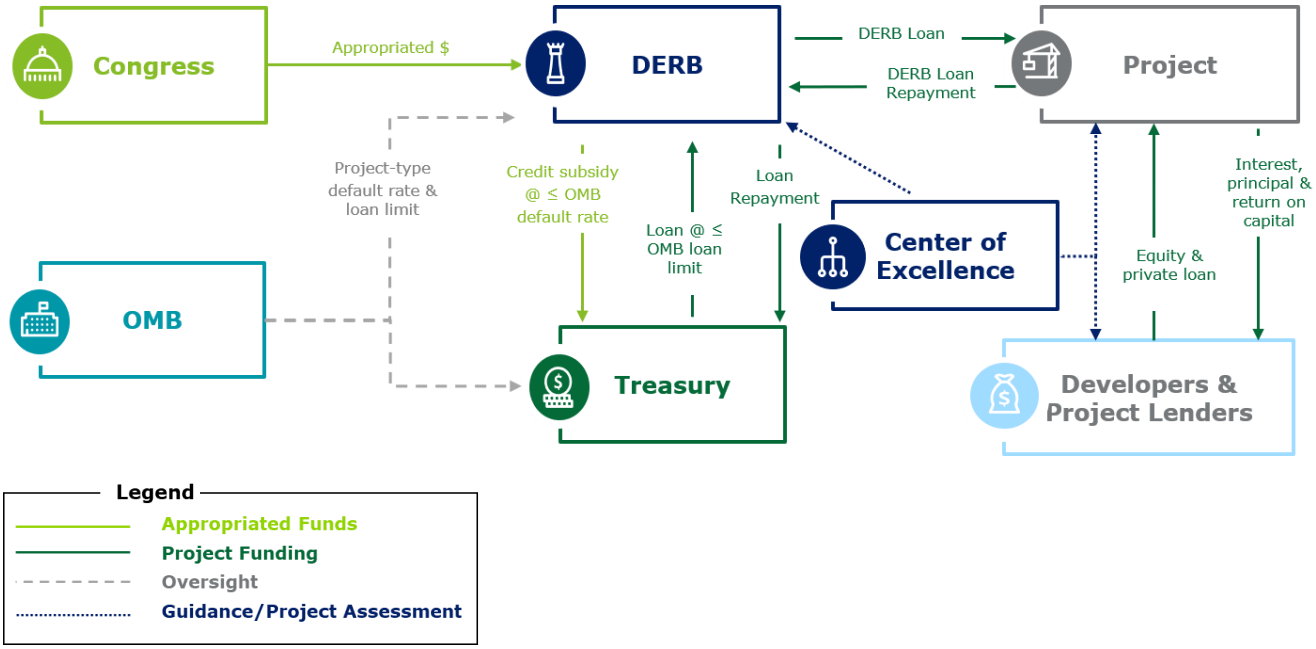
Table 5: Potential DERB Funding and Value of Projects Leveraged

DERB Appropriated Funds	Illustrative Default Percentage	Maximum DERB Loans Contribution	Potential Total Resilience Project Value ($ million)
$50 million	1%	40%	12,500
	8%	40%	1,563
	25%	40%	500
$100 million	1%	40%	25,000
	8%	40%	3,125
	25%	40%	1,000

As an example, with an initial capitalization of $50 million, the DERB could finance up to $1.56 billion of energy resilience projects, assuming an indicative 8% default rate and 40% maximum contribution to project costs by the DERB loan.

This report recommends the DoD model the DERB after the TIFIA alternative financing program, which is graphically shown in in **Figure 1**.

Figure 1: TIFIA Financing Structure



The TIFIA structure works as outlined below:

Congress appropriates funds for the TIFIA. For 2018, this authorization amounted to $285 million.[9] The TIFIA Program was established by the Transportation Infrastructure Finance and Innovation Act of 1998. The TIFIA statute is codified within title 23 U.S.C. § 601-609, with supporting regulations appearing in part 80 of title 49 of the Code of Federal Regulations (49 C.F.R. § 80).[10]

- Project developers apply for TIFIA assistance, typically as direct loans, within the program requirements (e.g., TIFIA cannot provide more than 33 percent of project costs).
- DOT and the Office of Management and Budget (OMB) estimate the TIFIA credit subsidy.
    - The credit subsidy represents the expected credit losses for the type of asset the project aims to develop. It provides information about the level of risk being undertaken by DOT and the subsequent performance of TIFIA-assisted projects. [11]
    - A single subsidy rate is calculated for all loans originated in a given fiscal year.
    - Typically, for transportation projects, the credit subsidy is below 10 percent of the proposed loan amount.
- The TIFIA program deposits the credit subsidy into the U.S. Treasury, taken out of the authorized money pool as collateral. This is held at the U.S. Treasury until the loan is repaid.
- The TIFIA program borrows full loan amount from the U.S. Treasury and issued the loan to the project developers.
- The project developers pay debt service on the outstanding loan until full repayment.
- The debt service received by the TIFIA program is the flow of funds used to pay back the U.S. Treasury.

The structure adopted by the TIFIA program allows an initial public funding to be leveraged multiple times in terms of infrastructure investments. TIFIA acts as anchor lenders providing low-cost debt financing to projects that go on to access other debt and equity investors. One dollar of TIFIA authorization can be leveraged to provide up to ten dollars of loan. Given the restrictions on TIFIA financing (less than 33 percent of the project costs), the total infrastructure costs that can be supported amounts to $30, a leverage of 30:1.[12]

For energy resilience projects, the total project costs that can be supported will depend on the default rate determined by OMB and the DERB team at DoD. The default rate incorporates the probability of default and the loss given default for a specific project. The default rate for energy resilience projects will vary whether the project is in a regulated or non-regulated, merchant

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[9] https://www.fhwa.dot.gov/fastact/factsheets/tifiafs.cfm

[10] U.S. Department of Transportation, Build America Bureau, Credit Programs Guide

[11] Congressional Research Services, Report R45516. "The Transportation Infrastructure Finance and Innovation Act (TIFIA) Program." https://crsreports.congress.gov/product/pdf/R/R45516

[12] https://www.fhwa.dot.gov/ipd/finance/tools_programs/federal_credit_assistance/tifia/

market, as regulated markets offer more certainties due to the cost of service regulation provisions. Cost of service regulation allows the utility to recover prudently incurred costs, including a fair return on investment. Whereas in non-regulated, merchant states, the returns to the project are determined solely by the market. As the DoD has potential energy resilience project across regulated and merchant states, combining projects across markets can potentially smooth risk, mitigating some of the riskiness of operating in merchant states.

The TIFIA model offers exceptional benefits that can enhance interest in DoD energy resilience projects if this model is chosen. These benefits include that the debt is highly sculpted. The TIFIA credit subsidy can be subordinate to the project's other debt obligations. The TIFIA model offers a low interest rate for the loan, generally in line with the 30-year U.S. Treasury rate plus one basis point. Repayment is up to 35 years for TIFIA-funded projects. Project developers can capitalize interest for five years after substantial completion, deferring the first payment. For the subsequent five years, the developer can make interest only payments. This 10-year runway provides more flexibility for the project developers to manage the financial obligations of the project. Additionally, the principal payments can be backloaded, with the requirement that 50 percent of the principal to be repaid in the first 25 years after substantial completion.

To be eligible for TIFIA and similar program assistance, a project sponsor must be deemed creditworthy and must have a dedicated source of revenue for repayment. These loan programs are successful when they involve projects with a clearly defined revenue stream that provides the source of loan repayment. The dedicated funding mechanism is either a new user fee or tax or the repurposing of existing fees and taxes.[13] In applying this TIFIA model to DoD energy resiliency projects, this funding opportunity would only be applicable to projects with a clear revenue or repayment stream of non-federal dollars.

The initial $50 million funds for the DERB could potentially come from ERCIP funding, while the DoD works with Congress to obtain appropriations for the DERB. Drawing on the resources of the Center of Excellence and the establishment of an energy resilience goal, the DERB can catalyze alternative financing in energy resilience projects by coordinating deals and highlighting opportunities to combine projects across the project portfolio. The Center of Excellence will provide staff with sophisticated knowledge of energy resilience projects, finance and lending terms, and contract negotiations. This informed team will be well positioned to work with renewable energy developers.

The DERB funding is applicable across a number of energy resilience project types, including ESPCs, UESCs, and EULs. The long repayment tenure discussed above is in line with timeline for EULs. The cheaper debt through the DERB is an additional incentive for ESPC and UESC providers. Lenders are comfortable with the TIFIA and WIFIA model, having shown that it can be very successful in the transportation and water infrastructure sectors. Combining energy resilience projects can also take advantage of DERB funding, accelerating the improvements in the DoD's portfolio.

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[13] https://crsreports.congress.gov/product/pdf/R/R45516

6 Conclusion

This report has recommended alternative approaches for using existing DoD authorities and leveraging existing federal lending programs to accelerate the financing and implementation of energy resilience projects. Accelerating alternative financing requires aligning the goals of installation energy managers and mission owners, who are focused on energy resilience, with the goals of debt and equity providers, who are focused on loan repayment and return on investment. To inform and support the recommendations presented in this report, Deloitte interviewed energy project developers, operators, financial institutions, banks, and investors to identify gaps and constraints under current practices and authorities. These interviews supported Deloitte's objective independent research and analysis of DoD authorities related to energy resilience. Deloitte's findings and assumptions were further confirmed through direct interviews with defense sector and civilian agencies actively working to support energy resilience projects.

Drawing on those interviews and other research, three clear recommendations emerged that would enhance DoD's abilities to successfully tap into sources of alternative financing and bring an accelerated volume of energy resilience projects to financial close utilizing private financing. Creation of a Center of Excellence that works with internal and external stakeholders, adoption of a consistent energy resilience goal across all service branches, and the formation of the DERB represent primary recommendations to support the DoD in achieving energy resilience objectives in support of the warfighter.

Appendix A: Overview of Policies and Directives

Table 6 summarizes the key documents that describe the DoD's strategy as it relates to installation energy and energy resilience. Table 7 summarizes the United States Codes that establish relevant authorities for executing DoD energy projects. Table 8 summarizes the key documents that provide guidance and reporting requirements for installation energy management.

Table 6: Summary of Key Strategy Documents

Document	Summary
National Defense Strategy	Sets out the United States' strategy to compete, deter, and win in an increasingly complex global security environment. Defines three lines of effort to expand the competitive space: building a more lethal force, strengthening alliances and attracting new partners, and reforming the DoD's business practices for greater performance and affordability.
DoDD 4180.01 (DoD Energy Policy)	Establishes policy and guidance and assigns responsibilities for energy planning, use, and management for the DoD. Provides for the establishment of DoD energy boards and councils. Incorporates, as appropriate, and cancels DoDI 4170.10.
DoDI 4170.11 (Installation Energy Management)	Provides guidance, assigns responsibilities, and prescribes procedures for DoD installation energy management.
10 USC § 101(e)(6)	Defines energy resilience as "the ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated energy disruptions in order to ensure energy availability and reliability sufficient to provide for mission assurance and readiness, including task mission essential operations related to readiness, and to execute or rapidly reestablish mission essential requirements."
National Defense Authorization Act FY 2019 Senate Armed Services Committee (SASC) Report	The Committee strongly supports the DoD's alternative financing pursuits and notes that it is uniquely positioned to develop energy resilience projects on its military installations to remediate risks from commercial electric and fuel grid disruptions.
Implementation Directive for Better Buying Power 3.0 – Achieving Dominant Capabilities Through Technical Excellence and Innovation	Provides guidance and definition to: achieve affordable programs; achieve dominant capabilities while controlling lifecycle costs; incentivize productivity in industry and government; incentivize innovation in industry and government; eliminate unproductive processes and bureaucracy; promote effective competition; improve tradecraft in acquisition of services; and improve the professionalism of the total acquisition workforce

Table 7: United States Codes Establishing Relevant Authorities

Document	Summary
10 USC 2371b (Prototype Projects—Other Transaction Authority)	Authority to carry out prototype projects directly relevant to enhancing mission effectiveness of military personnel and supporting platforms, systems, components, or materials
10 USC 2373 (Procurement for Experimental Purpose)	Authority to buy ordinance, signal, chemical activity, and aeronautical supplies for experimental or test purposes to develop the best supplies for national defense
10 USC 2410(q) (Multiyear Contracts)	Allows the Secretary of Defense to enter into contracts to purchase electricity from renewable energy sources
10 USC 2667 (Leases: Non-Excess Property of Military Departments and Defense Agencies)	Allows acceptance of "in-kind consideration" at any property under control of the Secretary. This can include construction of new facilities, maintenance/ protection/ alteration of existing property or facilities; provision of facilities for military department use; or provision of other services.

Document	Summary
10 USC 2668 (Easements for Rights-of-Way)	Allows the Secretary of a military department to grant easements for public lands under the Secretary's control
10 USC 2679 (Installation-support services: intergovernmental support agreements)	Allows the Secretary of a military department to enter into an intergovernmental support agreement with a state or local government on a sole source basis.
10 USC 2684a (Limit Encroachments)	Allows for agreements with State and local governments or other private conservation entities to preserve, manage, maintain, improve, and research cultural resources on adjacent sites on or near military installations. Agreements can be used to limit developments incompatible with installation mission, preserve habitat, and protect Clear Zone Areas from use or encroachment. They can also be used to acquire property or services that directly benefit the US Government and to manage natural resources on the land, including purchasing water rights for the military installation.
10 USC 2688 (Utility Systems: Conveyance Authority)	Allows for Utilities Privatization (UP) of base utility systems (water, wastewater, electrical distribution, power generation, gas, etc.)
10 USC 2912 (Availability and Use of Energy Cost Savings)	Allows the cost savings realized from shared energy savings contracts to be kept for 50% additional energy conservation and energy security measures or vehicle and equipment related uses and 50% other uses on the installation where the savings were realized
10 USC 2913 (Energy Savings Contracts and Activities)	Allows for Energy Savings Performance Contracts (ESPCs) and for Utility Energy Services Contracts (UESCs). EPSCs allow federal agencies to contract with ESCOs to implement energy conservation measures (ECMs) using third-party financing. UESCs between a government agency and public utility to develop projects that reduce cost and consumption using third-party financing.
10 USC 2914 (Energy Conservation Construction Projects)	Allows the Secretary of Defense to carry out energy conservation construction projects
10 USC 2916 (Sale of Electricity from Alternate Energy or Cogeneration Production Facilities)	Authorizes a military base to sell, contract to sell, or authorize an energy contractor to sell to a utility, electrical energy produced on military land by alternate (e.g., renewable) energy or CHP facilities
10 USC 2917 (Development of Geothermal Energy on Military Land)	Allows for development of a geothermal resources on land under the jurisdiction of a military Secretary (including public lands) for the use and benefit of DoD
10 USC 2919 (Participation in Programs)	Allows participation in demand response programs to manage energy demand or reduce energy usage during peak periods. Establishes an "Energy Savings Financial Incentives Fund" in the Treasury.
10 USC 2922a (Contracts for Energy or Fuel for Military Installations)	Allows for contracts to provide and operate energy production facilities under the Secretary of Defense's jurisdiction, or on private property
42 USC 501 (Services for Executive Agencies)	Sets out the authority of the Administrator of General Services for procuring services
42 USC 8256 (Incentives for Agencies)	Establishes incentive programs for energy efficiency and a Federal Energy Efficiency Fund to provide grants. Authorizes and encourages agency participation in utility incentive programs. Creates a financial bonus program to reward outstanding Federal facility energy managers and allows agencies to retain energy and water savings.
42 USC 8287 (Authority to Enter into Contracts)	Sets out the general authority for the head of a Federal agency to enter into contracts for energy savings and ancillary benefits (specifically ESPCs)

Table 8: Guidance and Reporting Requirements

Document	Summary
10 USC 2911 (General Energy Policy)	"The Secretary of Defense shall ensure the readiness of the armed forces for their military missions by pursuing energy security and energy resilience." Sets out requirements to define energy performance goals and to develop a comprehensive Energy Performance Master Plan.
10 USC 2925 (Annual DoD Energy Management Reports)	Requires the Secretary of Defense to submit an installation energy report to the congressional defense commission within 120 days after the end of each fiscal year. Also requires a report on operational energy management and implementation of the operational energy strategy.
10 USC 2925(a)	Sets out the reporting requirements of annual installation energy reports
10 USC 2915 (Facilities: Use of Renewable Forms of Energy and Energy Efficient Products)	Requires the Secretary of Defense to encourage the use of solar energy and other renewable/efficient energy sources if they are determined to be cost effective
10 USC 2918 (Fuel Sources for Heating Systems)	The primary fuel source on any new heating system constructed under the military department's jurisdiction must be the most cost effective fuel over the system life cycle.
Energy Resilience: Operations, Maintenance, & Testing (OM&T) Strategy and Implementation Guidance	Provides installation commanders, mission operators, operations and maintenance staff, utility mangers, energy managers, government contractors and subcontractors, and installation support personnel with procedures to ensure that energy generation systems, infrastructure, equipment, and fuel are available and reliable to support critical mission operations on military installations
DoD Financial Management Regulation (FMR) 7000.14-R, Volume 12, Chapter 12 : Identification, Retention, and Use of Energy and Water Conservation Savings	Prescribes financial management policy and procedures for the identification, retention, and use of energy and water cost savings as detailed in Title 10, United States Code, sections 2866, 2912, 2913, 2914, 2915, and 2916.
FAR Part 41 (Acquisition of Utility Services)	Describes the policies, procedures, and contract format for acquiring utility services
10 USC 2662 (Real Property Transactions)	Describes Congressional reporting requirements and wait times prior to execution of leases, transactions, contracts for over 20 year terms, easements, and licenses over certain thresholds
NDAA FY 2019	Authorizes appropriations for FY 2019 for military activities of the DoD, for military construction, and for defense activities of the Department of Energy, to prescribe military personnel strengths for such fiscal year, and for other purposes. Division A sets out DoD authorizations, Division B sets out military construction authorizations, Division C sets out Department of Energy national security and other authorizations, and Division D sets out funding tables. Section 312 amends 10 USC 2911 to establish metrics and standards for assessing energy resilience, to require mission assurance and readiness assessments of energy power systems, and to include energy security and resilience goals in installation energy reports. Section 312 also amends 10 USC 2922a(d) to prioritize energy security and resilience in the provision and operation of energy production facilities. Section 313 amends 10 USC 2916(b) to specify that proceeds from sale of electrical energy generated from geothermal energy resources shall be divided between an appropriation account and a special Treasury account for installation energy or water security projects on the installation with the geothermal energy resource.
Unified Facilities Criteria (UFC)	Provide criteria for the planning, design, construction, sustainment, restoration, and modernization of facilities in accordance with DoD Directive 4270.5 (Military Construction) and the Under Secretary of Defense for Acquisition, Technology, and Logistics Memorandum dated May 29, 2002. Key criteria include:

Document	Summary
	• UFC 1-200-01: General building requirements, including energy efficiency (2-13) • UFC 2-100-01: Requires energy conservation, including improvement of energy security, as part of installation planning goals (2-2.11) • UFC 3-470-01: Utility monitoring and control system front end and integration • UFC 3-500s: Electrical series, including stationary battery areas, generators, and utility-scale renewable energy systems

Appendix B: Common Risk Mitigation Packages and Contractual Provisions

Table 9 summarizes the data inputs necessary for capital providers to reduce construction risk, including the risk mitigants discussed in this section, and the data inputs necessary to implement these methods for mitigating construction risk.

Table 9: Data Input Required to Reduce Construction Risk

Risk Mitigant	Data Input Required
Contractual Structure	A lump sum, turnkey contract, date-certain construction contract
Experienced, credit-worthy contractor	Lender to evaluate contractor's ability to pay for the contract and any cost overruns
Contingency Funds	Percentage of construction budget that can be earmarked for contingencies
Retainage	Percentage of payment to contractor to be withheld to create cash reserve held in escrow to backstop the contractor's obligations
Parent Guarantees	Guarantee issued by parent company of contractor
Liquidated damages	Types of LDs, milestone dates, cap
Performance bonds	Contractual requirements such as milestones, operating requirements; letter of credit issued by financial institutions

Table 10 describes the data inputs required for capital providers to reduce operating risk. The table shows the various risk mitigants discussed in this section, and the data inputs necessary to implement these methods for mitigating operating risk. In many cases, project documents and commercial contracts will capture the data required by lenders and investors to commit capital and reach financial close. The specific inputs will vary depending on a host of factors for each of these risk mitigants. Based on conversations with the financial community, the typical ranges for each of these mitigants can be captured in the Risk Rating Tool.

Table 10: Data Input Required to Reduce Operating Risk

Risk Mitigant	Data Input Required
Technical Tests	Specific to the type of project or technology. Examples include heat rate, capacity utilization, and emissions levels for various elements.
O&M Contracts	Desired performance levels, penalties and damages for failing to meet contractual obligations, and allocation of cost overruns between the operator and the equity owners
Performance LDs	Projection of losses in revenue or additional operating expenses induced by the construction contractor's failure to meet the specifications
Warranties	Contractual requirements, warranty bond, letter of credit
O&M Contract	Performance criteria, penalty schedule
OMRA	O&M assumptions, budgeted O&M expenses, actual historical O&M expenses

Risk Mitigant	Data Input Required
MMRA	Major maintenance and refurbishment assumptions, budgeted MM costs

Table 11 describes the data inputs required for capital providers to reduce revenue risk, and the data inputs necessary to implement these methods.

Table 11: Data Input Required to Reduce Revenue Risk

Risk Mitigant	Data Input Required
Take or pay provisions	Minimum payment amounts and energy generation volumes negotiated in the contract
Contract duration	Duration of financing
Termination and default provisions	Specific language of provisions in contract that triggers termination for convenience or for default by the signing party
Pass through costs	Commodity costs, O&M costs, environmental costs, and capex
Improve credit quality of offtaker	Credit ratings
Managing fuel supply/resource risk	Hedging contracts, long-term commodity contracts
Price indexation for inflation risk	Price benchmarks
Availability payments	Key performance, environmental and social standards
Building intermittent generation sources with storage	Technical and financial feasibility studies, PPAs, feed-in tariffs, capacity payments

Table 12 describes the metrics evaluated by capital providers to reduce market risk, and the data inputs necessary to implement these methods for mitigating market risk.

Table 12: Data Input Required to Reduce Market Risk

Risk Mitigant	Data Input Required
Contractual Structure	Agreements executed with the offtaker or the local regulatory authority
Merchant Risk	Market demand and competition analyses from third-party consultants, financial hedging techniques such as HRCO and revenue puts

Table 13 describes the metrics utilized by capital providers to reduce financial risk, and the data inputs necessary to implement these methods for mitigating financial risk.

Table 13: Data Input Required to Reduce Financial Risk

Risk Mitigant	Data Input Required
Liquidity Support	Period of debt service, timing of funding, letter of credit
Flow of Funds	Project payment waterfall and detailed capital structure
Distribution Lock-up	Debt coverage ratios
Interest Rate	Variable or fixed interest rate structure; benchmark utilized in setting variable interest rate (e.g. LIBOR)

Risk Mitigant	Data Input Required
Force Majeure	Negotiated by developers and borrowers based on likelihood of force majeure events and estimated scale and permanence of impact of such events on the project
Events of Default	Negotiated by developers and borrowers based on estimated likelihood of default, cure periods, step-in rights, and method for calculation of cost reimbursement