Securing Digital Energy Infrastructure: BESS Procurement Guidance & Sample Contract Terms

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Battelle Energy Alliance manages INL for the
U.S. Department of Energy's Office of Nuclear Energy

Idaho National Laboratory

Introduction

- Technical Assistance Program
- Today's Focus: Procurement Guide & Sample Contract Terms
- Outcome and Outreach repeat

BESS Supply Chain Security Procurement Guidance and Sample Contract Terms

- Section 1 — Introduction
- Section 2 — Maturing BESS Cyber Supply Chain Security: General Overview
- Section 3 — Maturing BESS Cyber Supply Chain Security: Procurement Bidding and Selection Process
- Section 4 — Maturing BESS Cyber Supply Chain Security: Supplier Risk Assessment
- Section 5 — Maturing BESS Cyber Supply Chain Security: Vendor Agreements and Procurement Terms
- Section 6 — Maturing BESS Cyber Supply Chain Security: Supplier Management Controls
- Section 7 — Conclusion
  - References
  - Appendix

Acronyms

- BESS – Battery Energy Storage System
- BES – Bulk Electric System
- DERMS – Distributed Energy Resource Management System
- EVSE – Electric Vehicle Supply Equipment
- OT – Operational Technology
- ICS – Industrial Control System
- TA – Technical Assistance
- SIEM - Security Information and Event Management
- IDS – Intrusion Detection System
- SCRM – Supply Chain Risk Management
- IBR – Inverter Based Resources
- OEM – Original Equipment Manufacturer
- SBOM – Software Bill of Materials
- HBOM – Hardware Bill of Materials
- NERC CIP – North American Electric Reliability Corporation, Critical Infrastructure Protection
- NDAA – National Defense Authorization Act

Webinar/Outreach Series – Technical Assistance for Digital Assurance (TADA)

- Introduction to the TA Program for GRIP Awardees (Kicked off in April – available Online)
- Cyber Informed Engineering Introduction & Training (August – Available online)
- Procurement and Contracting Guide for BESS & associated components (Today)
- Cyber Incident Response, OT Monitoring and building a security program for digital assets (Spring 2025)

https://inl.gov/csdet-technical-assistance-and-training/

Technical Assistance for Digital Assurance

Core Challenge. Many of the inverters, BESS, EVSE and software packages have a limited domestic supply chain

We must **enable** the **resilient deployment**, while also providing appropriate mitigations, training, support and security management solutions for digital controls

GDO enlisted INL to develop and deliver a **component security evaluation** and **mitigation technical assistance program** for key digital energy components

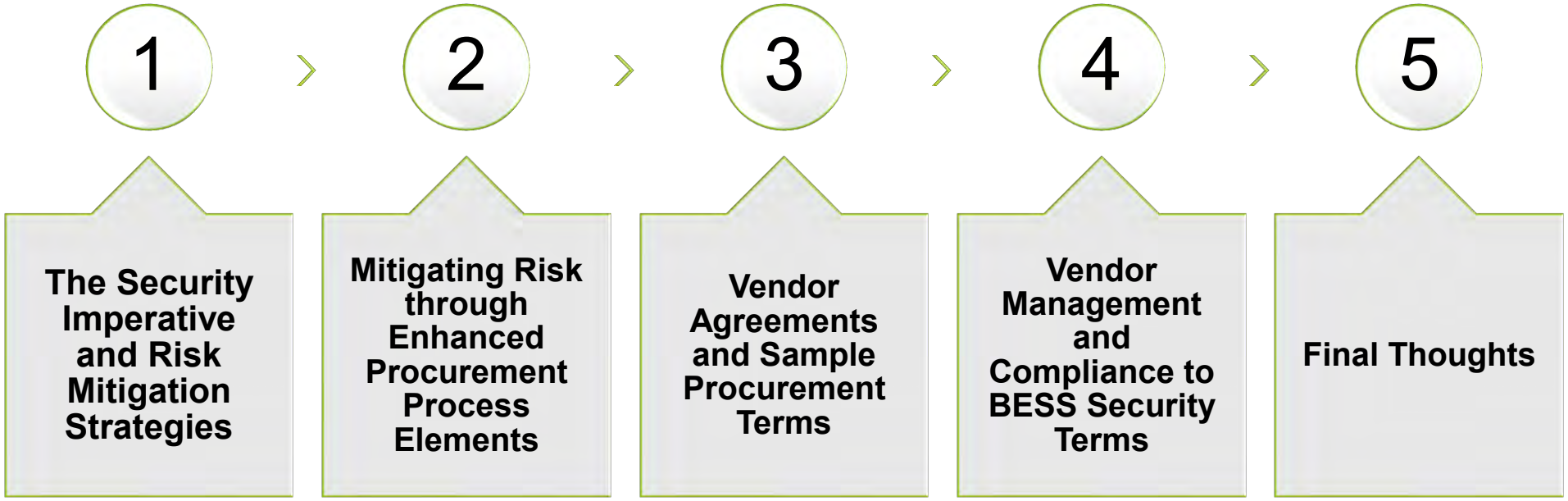
Technical Assistance (TA) is being offered to all GRIP and Grid Resilience State/Tribal Formula Grant Program Awardees at different stages of procurement and design

Program Enrollment. This program has open enrollment and sign up links are included on this slide.

TA Sign up here (for more info):
https://inl.gov/csdet-technical-assistance-and-training/

https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program-technical-assistance-resource-center

What is supply chain risk management in the context of electric grid modernization: Overview



BESS Supply Chain Security Risk Management

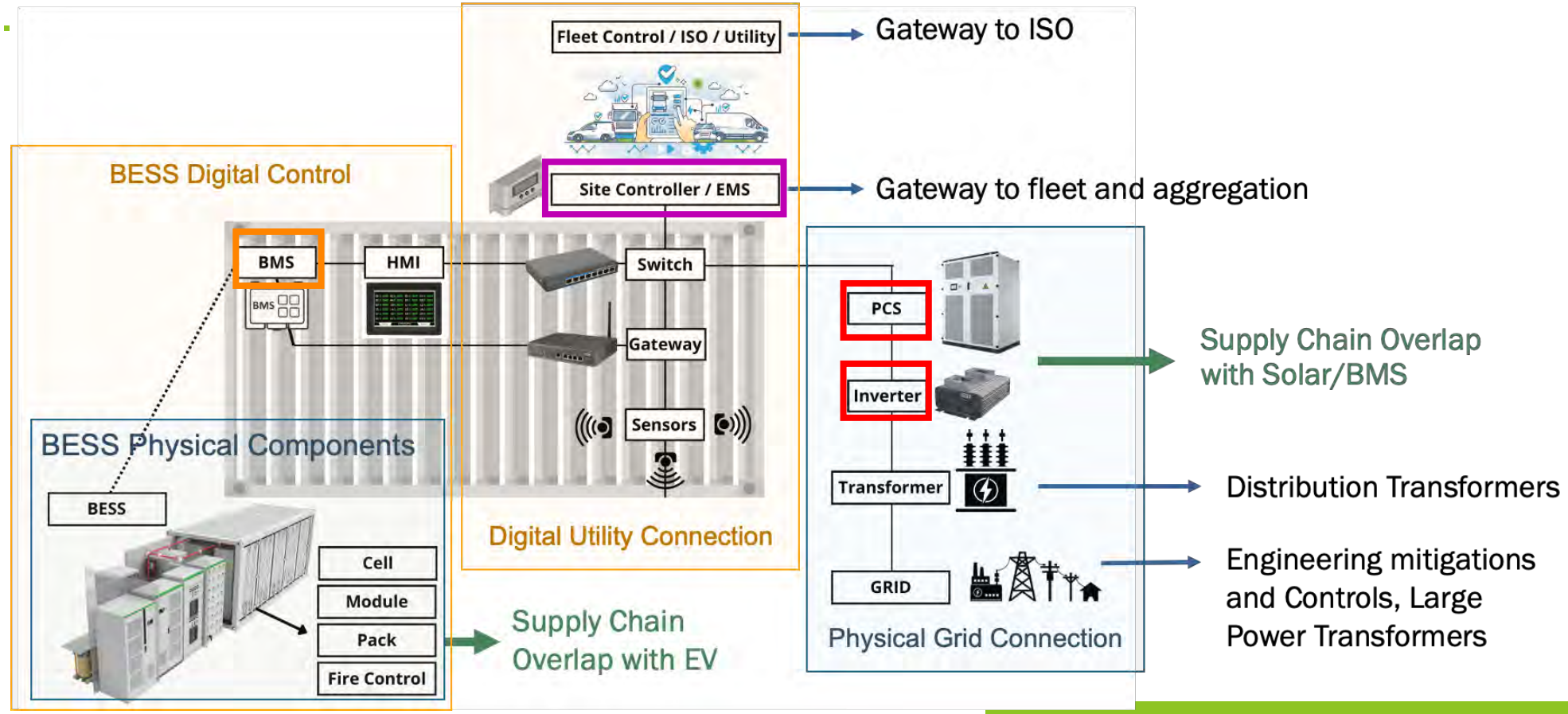
The Security Imperative & Risk Mitigation Strategies

Complex BESS, DERMS and IBR Supply Chain Extends across Energy Ecosystem

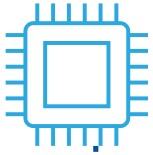
Battery component OEMs have evolved to be integrators and suppliers across the energy ecosystem, not just BESS. Integrator and supplier relationships create a complex web that obfuscates hardware origin and foreign influence.

Supply chain reports are challenging to interpret as they mix:

- Integrator vs. Core Supplier
- OEM products and "white-labeled" products
- EV & BESS components



Supply Chain Challenges & Securing Digital Assets: Common Global Challenges - Procurement & Integration

1. Failing Chips 
2. Persistent Communications 
3. Hardcoded Passwords 
4. Operation & Maintenance Models
5. White Labeled Products 
6. Insecure Support Software
7. No SBOMs or HBOMs 
8. Unknown Supply Chain ‘Spiderweb’ for Integrated Systems 
9. Limited Threat and Consequence Modeling Capabilities

Supply Chain Challenges & Securing Digital Assets: Common Global Challenge - Lack of Transparency & Control

Introduction of Risk During Production Process

- Design
- Procurement of Subcomponents (e.g., processing chips)
- Manufacturing
- Assembly
- Shipping

Limited Transparency & Control

Foreign Entity of Concern Organization (FEOC) Risks

- No regulation/oversight of design and manufacturing processes
- Foreign government pressure (adversarial action or provide customer information/data)
- Limited legal rights in foreign jurisdiction

Supply Chain Challenges & Securing Digital Assets: Mitigation of Risk is Key

Digital Asset Risks (Illustrative)	Digital Asset Risk Mitigation (Illustrative)
Remote Monitoring and Control Capabilities (expanding adversary attack surface)	SIEM/IDS, access management, packet monitoring
Remote software and firmware update capabilities, which can allow suppliers to quickly deploy patches, but also expose the equipment to the potential of malicious firmware uploads	Isolate systems/assets/components; manual review and approval processes
Reliance of critical systems on the software and firmware in digital equipment	Supply chain risk management and procurement processes for critical asset support software and firmware
Capability to rapidly change the functionality or behavior of devices through malicious or error-filled code updates	Remote access and internal change management; internal network monitoring controls
Proliferation of stakeholders who need, or claim to need, access to digital devices and their data	Rigorous access management processes, frequent review, confirm and updates; internal network/access monitoring

Illustrative examples provided for discussion purposes, lists are not exhaustive

Supply Chain Challenges & Securing Digital Assets

Building Resilient Systems for Electric Grid Modernization

- ***Electric Vehicles (EVs) Supply Infrastructure***
- ***Battery Energy Storage Systems (BESS)***
- ***Management Systems Inverters***
- ***Orchestration software (Distributed Energy Resources Management Systems (DERMS)***
- ***Advanced Distribution Management Systems (ADMS)***

Grid Modernization

Limitations on available US-Manufactured products for electric grid modernization

Project design optimization – criticality of application to your operations

Securing Critical Infrastructure

Security risks with geopolitical supply chain landscape

Project design optimization – secure supply chain

See the following sections of the FOA for information on disclosure requirements, domestic content, and related information: IV.D.xxi; IV.I; VI.B; Appendix B; Appendix C.

Critical-and-Emerging-Technologies-List-2024-Update.pdf (whitehouse.gov)

BESS Supply Chain Risk Management: Policy Trends

Supply Chain Cybersecurity Principles for End Users

Impact-Driven Risk Management
Embed consideration of impacts, specifically including those in your own upstream supply chains, throughout the entire systems engineering lifecycle, seeking to manage risks to functions that are aided by digital technologies.

Framework-Informed Defenses
Incorporate appropriate principles and practices from recognized cybersecurity frameworks into the design of your organization's defenses of its critical functions, infrastructure, and information.

Cybersecurity Fundamentals
Follow relevant domain-specific regulations and international standards, and consider secure and cyber-informed engineering and design principles, to employ products and services in a secure manner, taking into account accumulated technical and security debt.

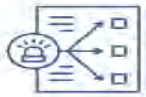
Secure Development & Implementation
Engage with suppliers to understand the security features and controls of their offering to ensure they are adequate for your intended purpose or identify necessary compensating controls.

Transparency & Trust Building
Include contractual language for those terms, conditions, and testing requirements that will influence your security outcomes, and which you are able and willing to enforce.

Implementation Guidance
Develop and maintain appropriately secure operating environments, following suppliers' hardening and secure implementation guidance.

Lifecycle Support & Management
Conduct business planning and provide resources to acquire, maintain (including patch management and fixes recommended by the supplier), and replace equipment through its lifecycle, considering continued availability of supplier technical support.

Proactive Vulnerability Management
Maintain a risk-informed vulnerability management process that aligns with the supplier's published process for coordinated disclosure of vulnerabilities discovered through use of their products.



Proactive Incident Response
Proactively coordinate supplier support during response to incidents involving their products or services.

Business & Operational Resilience
Continually improve your organization and its practices by adaptation from observations, insights, and lessons learned from ongoing operations, supplier experiences, and incident response.

DOE SUPPLY CHAIN CYBERSECURITY PRINCIPLES 3

BESS Supply Chain Risk Management: Regulation and Legal Trends

Common Approaches	*Regulatory-Legislative*	*Contractual & Other Obligations*
Enforcement	Government/Agency Oversight and Enforcement Protocol	Private Party Contract Terms, Civil Litigation
Implementation	Compliance Program, Governance, Executing Controls	Internal Controls, Risk Management Programs
Penalties	Financial Penalties, Regulatory Directives, Increased Scrutiny, License & Authority Revocations	Termination of Agreement/Policy, Financial Assessment/Damages

NERC CIP

[summary text placeholder]

NDAA

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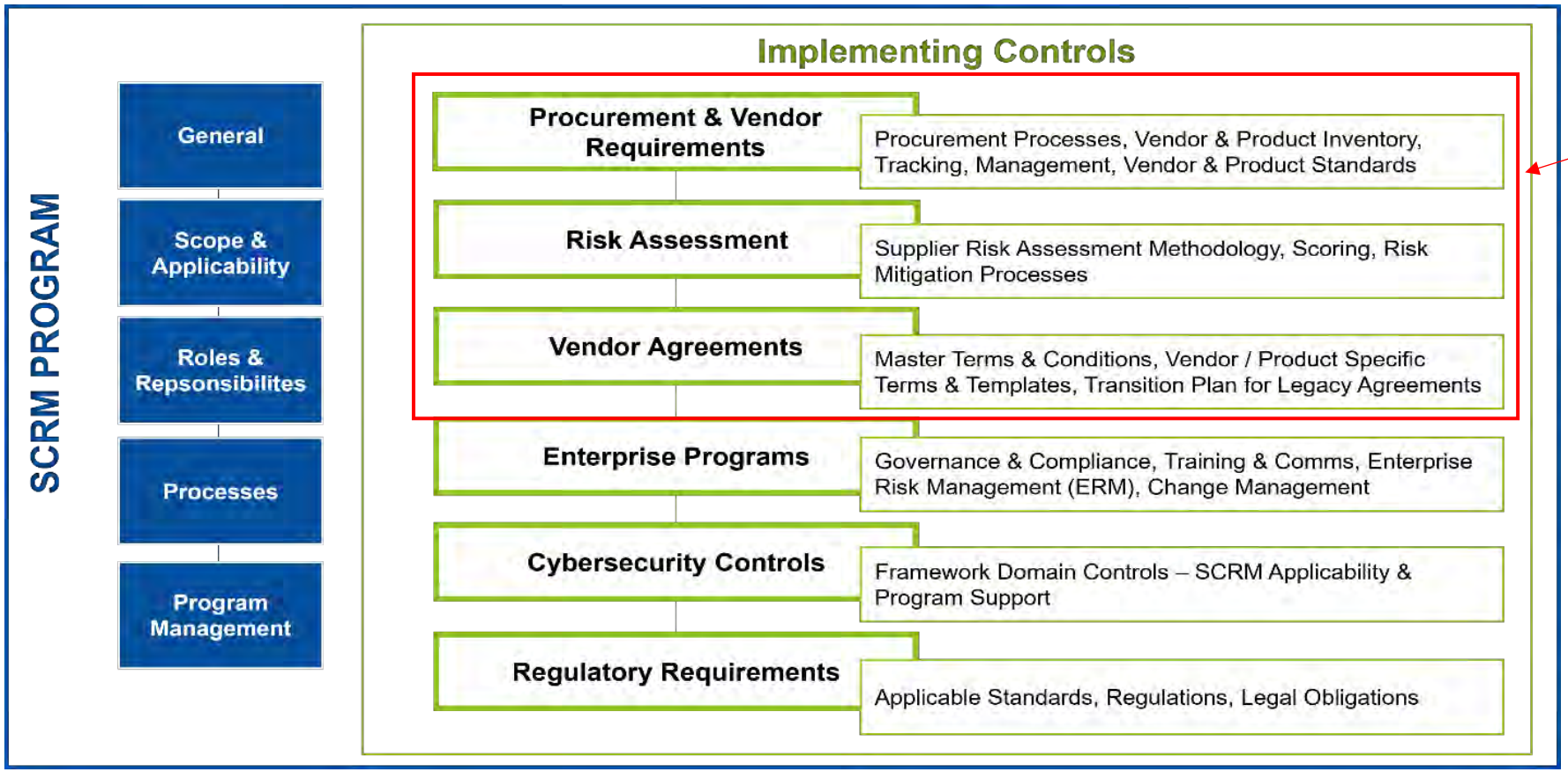
BESS Supply Chain Security Risk Management

Mitigating Risk through Enhanced Procurement Process Elements

Securing the BESS Supply Chain

Maturing Cyber Supply Chain Security

Supply Chain Risk Management (SCRM) Program Basics



Critical Risk Mitigation Elements focus for this Guide

Securing the BESS Supply Chain: Integrating Cybersecurity into Procurement Programs

Focus on **critical elements** that will support ability to **maximize risk mitigation** in early stage and less mature programs. Established programs focus on these elements as priority areas for improvement.

1 Bidding & Vendor Selection Process

- Request for Proposal (RFP), Bid Solicitation, Referral, Direct Outreach, Other Requests
- Request and Solicitation communications should include information about minimum cybersecurity requirements for applicable assets/services
- Initial selection of primary and secondary suppliers to support procurement objectives for assets/services

2 Supplier Risk Assessment

- Define organizational risk profile and supplier risk assessment methodology
- Initial supplier risk analysis to determine applicability of required Supplier Risk Assessment (refer to sample Decision Tree)
- Complete supplier assessment using defined Risk Assessment Methodology
- Complete scoring, any additional required analysis, exception process or other reviews to inform final decision. Select Supplier(s)

4 Supplier Management

- Define process/controls for monitoring vendor compliance to cyber and supply chain security agreement terms including spot checks and periodic assessments
- Implement internal controls for contract and vendor inventory management, including monitoring of legacy agreement expiration/renewal for application of new program requirements
- Ensure coordination with controls monitoring supply chain security risk alerts and directives, (e.g., White House, CISA, ISACs, DOE)

3 Contracting (Procurement Terms)

- Confirm any additional/exception requirements are understood prior to issuance of procurement agreement for review
- Procurement Agreement including applicable procurement terms setting forth cyber and supply chain security requirements
- Review and negotiation processes should include guidance on: Negotiable and Non-Negotiable terms; Exceptions processes; Additional terms/provisions where exceptions are permitted (e.g., additional agreed upon risk mitigation measures)

This BESS Procurement Guide is part of a series of INL publications and supporting initiatives focused on enhancing BESS cybersecurity. For additional information on INL Digital Assurance project initiatives and other available resources, visit the Center for Securing the Digital Energy Transition

Procurement Bidding and Selection Processes

Initial Outreach

Initial outreach communications should include information / foundation regarding the expectations for supply chain security criteria

RFP & Bid Solicitation

Define all requirements in the forml request for proposal and bid solictiation materials to ensure supplier has considered these obligations as part of the bid.

Internal teams should expect the cost of these requirements may increase the cost of the product/service.

General Supplier Program

General program materials, communications, websites, brochures and other material content should be updated to include high level insights and guidance about the new program requirements for cybersecurity.

Supplier Inventory & Management

An inventory of all suppliers is important to mitigating risk. Monitoring additions and removals/terminations, is necessary to assess security needs. At a minimum, an inventory of any supplier subject to security requirements should be developed and maintained.

BESS Vendor Risk Assessment

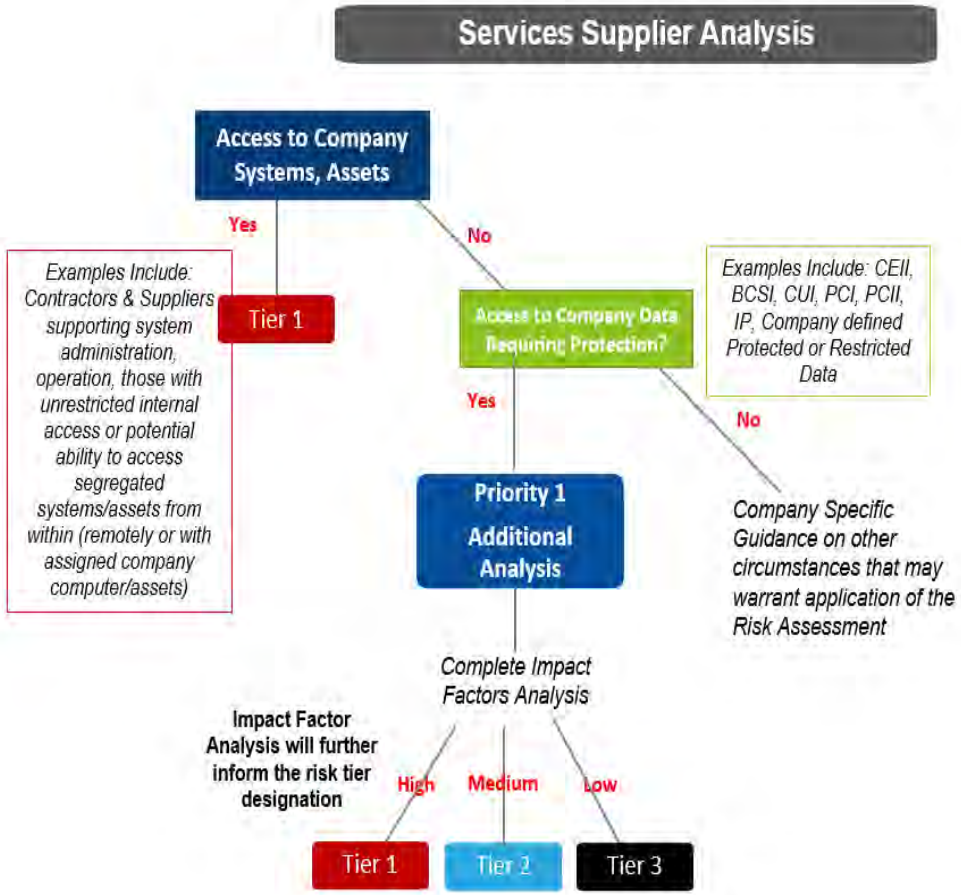
Key criteria and considerations for stronger SCRM programs

Products vs Services Vendors	• Risks for products vendors may be different than risks for services vendors. Mitigation controls may differ as well. Important to distinguish.
Legacy vs New Suppliers	• Program applicability to legacy assets will likely need to be longer term initiative to transition vs. immediate applicability to new suppliers.
Define Risk Priorities	• Risk profile and priorities differs for every entity. Critical to understand cross-implications to all business, operational, security, and other org risks.
Risk Assessment Methodology	• Well-defined methodology that accounts for risk-based approach to applicability, assessment, exceptions processes helps prevent backlogs.
Supplier Inventory & Management Controls	• Supplier inventory as important as inventory of products and services. Need to develop and manage to ensure ability to apply risk-based controls.
Exemption Processes	• Exemption processes should be considered and defined within the program. These should be reviewed and updated with periodic updates.
Small Business & Independent Contractor Models	• Current assessment models do not account for unique infrastructure/ architecture of smaller business and independent contractors.

BESS Vendor Risk Assessment: Initial Intake Analysis

May not be able to assess all vendors. Risk-based initial analysis will help focus on higher risk and maximize risk mitigation objectives

Illustrative: Sample Initial Analysis Risk Decision Tree for Services Suppliers



Impact Factor Analysis should include the following in addition to company specific considerations:

- *Operations - Grid*
- *Operations - Internal*
- *Operations – Business Systems (IT, Finance, Billing)*
- *Reliability – Grid*
- *Security – Cyber, Physical*

Determination of Initial Risk Tier guides Decisions about the application of Risk Assessment & security specific procurement terms

Tier 1 High Risk — Complete full Risk Assessment for Tier 1 Suppliers & use all applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences)

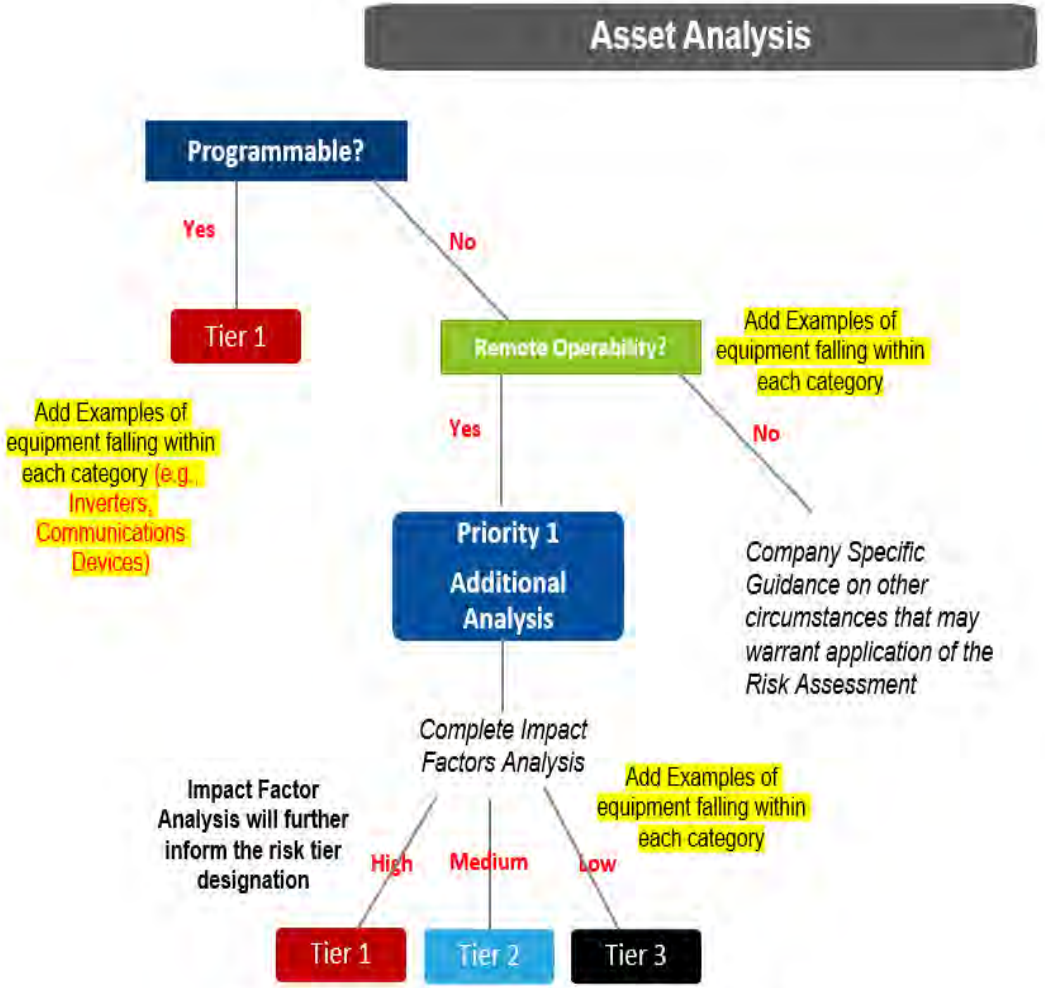
Tier 2 Medium Risk — Complete full or partial Risk Assessment for Tier 2 Suppliers & use any applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences)

Tier 3 Low Risk — Complete partial Risk Assessment for Tier 3 Suppliers ***if warranted*** & use any applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences).

Some organizations may create "Tier 1, 2, 3" categories for the Cybersecurity & Supply Chain Risk Procurement Terms to be included to provide additional guidance.

BESS Vendor Risk Assessment: Initial Intake Analysis

May not be able to assess all vendors. Risk-based initial analysis will help focus on higher risk and maximize risk mitigation objectives



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Determination of Initial Risk Tier guides Decisions about the application of Risk Assessment & security specific procurement terms

Tier 1 High Risk — Complete full Risk Assessment for Tier 1 Suppliers & use all applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences), **including required SBOM/HBOM**

Tier 2 Medium Risk — Complete full or partial Risk Assessment for Tier 2 Suppliers & use any applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences). Provide Guidance on **requirements for SBOM/HBOM**

Tier 3 Low Risk — Complete partial Risk Assessment for Tier 3 Suppliers ***if warranted*** & use any applicable Cybersecurity & Supply Chain procurement terms (based on company risk profile and preferences).

Some organizations may create "Tier 1, 2, 3" categories for the Cybersecurity & Supply Chain Risk Procurement Terms to be included to provide additional guidance.

Illustrative: Sample Initial Analysis Risk Decision Tree for Product & Equipment Suppliers Analysis

BESS Vendor Cybersecurity Risk-Assessment Methodology

For the vendors and suppliers that require a risk-assessment, you will need a methodology

BESS Vendor Cybersecurity Risk-Assessment Methodology: Supplier Evaluation

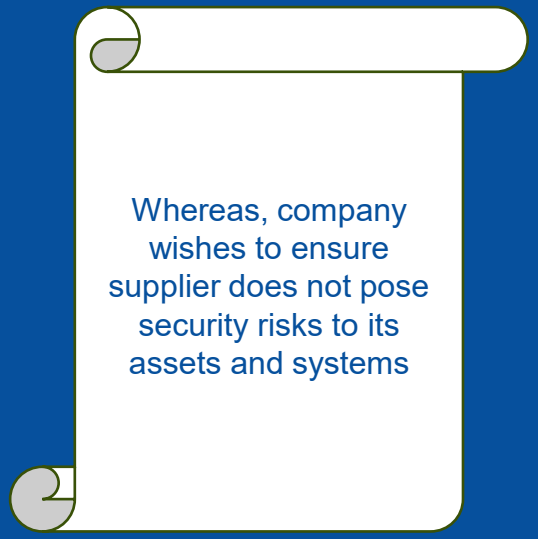
Typically completed through questionnaire aligned to standards framework to verify basic cybersecurity hygiene and selected specific requirements (e.g., SBOM, entity specific criteria)

Application of scoring criteria and risk assessment methodology, identify any existing gaps, evaluate score and gaps

Results documented with supplier file/detail, identify and document additional requirements to address risk gaps, ensure these are integrated into contract

BESS Supply Chain Security Risk Management

Vendor Agreements and Sample Procurement Terms



Vendor Agreements and Procurement Terms

Disclaimer: This BESS Procurement Guide and these terms and conditions do not purport to provide legal advice. Counsel should be consulted to obtain advice and guidance for use within any agreement.

Cybersecurity Definitions — Appendix

- Terms and definitions specific to cyber, physical and supply chain security for review and integration into the agreement.
- Aligned to common / standard definitions (NIST, CISA primary sources).
- Should be reviewed against standard terms and definitions and aligned.
- Periodically review and update to ensure current version.

General Cyber & Supply Chain Security — §5.4

- Major security program requirements typically required of most entities.
- Sample terms for incident response and notification of security incidents and breach.
- Hardware Bill of Materials (HBOM) and Software Bill of Materials (SBOM) terms for products. These should be reviewed and aligned to current state models as they evolve.

Enterprise Cyber Hygiene Requirements — §5.5

- Aligns to common standards framework and CISA recommended actions and basic maturity security.
- Assessment and Certification from credible assessor may satisfy some of these. Verify assessor prior to accepting.
- Sample terms for all standard cybersecurity framework domains and program controls. Select on case-by-case basis to support the objectives of the service / product relationship.

BESS Equipment Terms & Conditions — §5.6

- Terms to address additional BESS specific risks.
- Sample terms for common risks included here.
- Develop additional BESS asset/component specific requirements addressing your security risks (e.g., specific access controls, specific tool or use or services activities).
- This may include HBOM and SBOM if not included in one of the other sections **or** an asset specific SBOM or HBOM.

Main Contract Review & Integration

Reminder to review the main contract terms and definitions to ensure alignment and prevent cross-implication issues.

Small Vendor & Independent Contractors

*Small **services** vendors and independent contractors may require unique approaches and different terms.*

Sample Terms provided are based on current leading practice. Where integrated into a program model or template, ensure a control for periodic review and update.

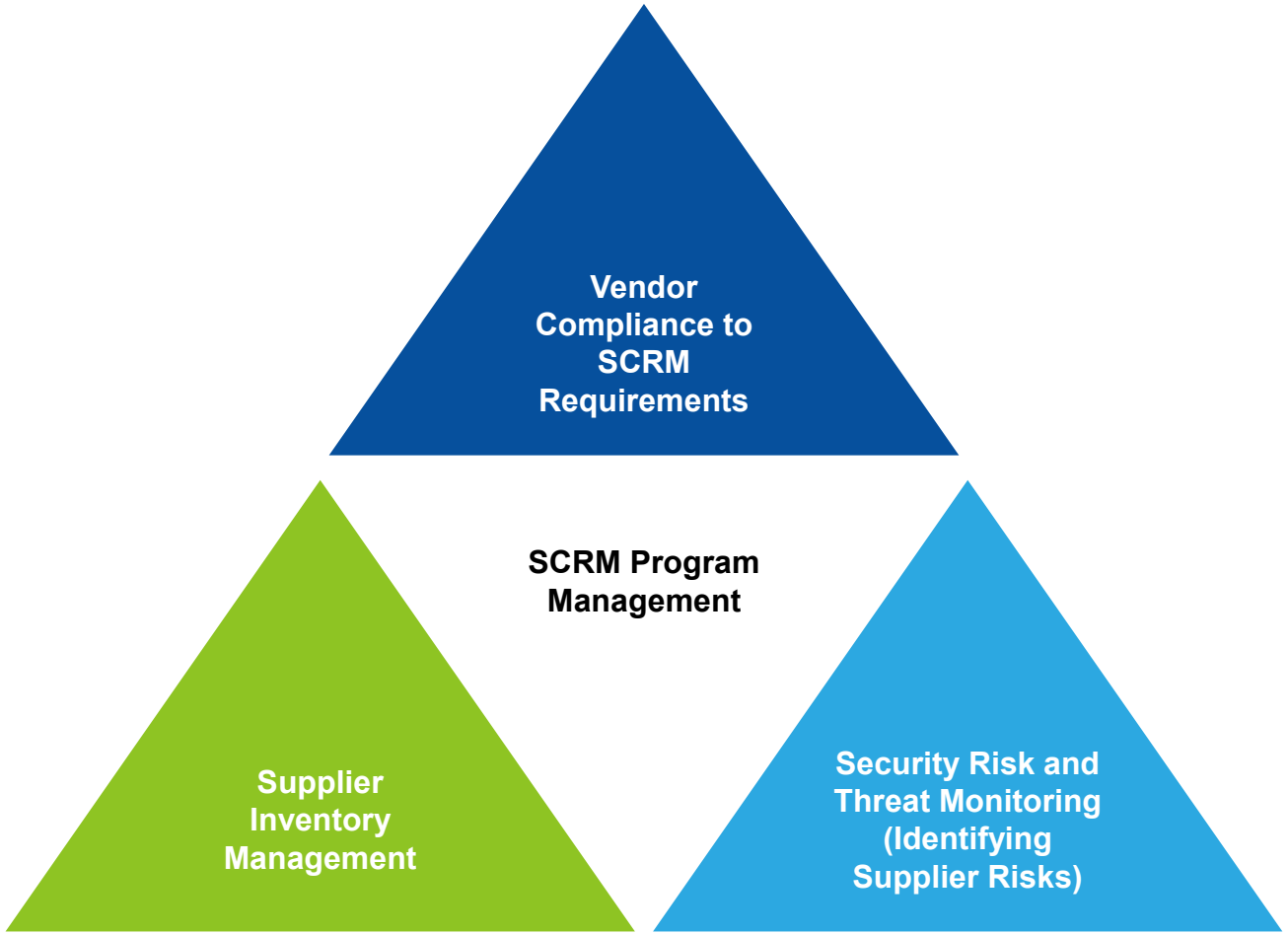
BESS Supply Chain Security Risk Management

Vendor Management and Compliance to BESS Security Requirements

[Placeholder for picture or graphic]

Vendor Management Controls

Important to maintan your program and monitor for new vendors and/or risks that may impact the application of requirements to new and existing vendors.

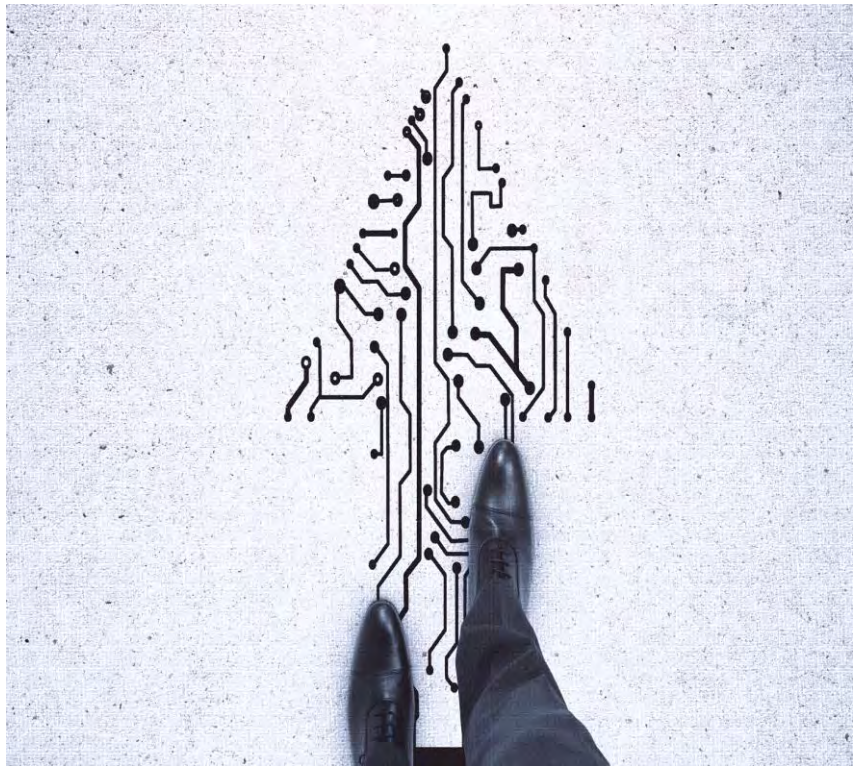


BESS Supply Chain Security Risk Management

Conclusion

Final Thoughts

- Not a one and done
- Things learned here could apply across the range of supply chain
- This is guidance, not prescription - always review your own standards, requirements for compliance etc.
- TA – is available upon completing the application via the link
  - https://inl.gov/csdet-technical-assistance-and-training/
- Guide will be released in a few weeks



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Idaho National Laboratory

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