



USAID CLEAN POWER ASIA

PHOTO CREDIT: ISTOCK.COM

# Using a Risk Matrix to Evaluate and Score Vulnerabilities for Risk

Engaging Stakeholders in Assessing Vulnerabilities in the Lao PDR Power Sector Workshop  
Crowne Plaza Hotel, Vientiane  
August 21-23, 2018

Jason Vogel, Abt Associates

Sherry Stout, U.S. Department of Energy's National Renewable Energy Laboratory (NREL)

# Typical Risk Matrix

Consequence

High	Medium	Medium-to-high	Medium-to-high	High	High
Medium-to-high	Medium	Medium	Medium-to-high	Medium-to-high	High
Medium	Low-to-medium	Medium	Medium	Medium-to-high	Medium-to-high
Low-to-medium	Low-to-medium	Low-to-medium	Medium	Medium	Medium-to-high
Low	Low	Low-to-medium	Low-to-medium	Medium	Medium
	Low	Low-to-medium	Medium	Medium-to-high	High

Likelihood

Risk Category		Risk Description		Risk Assessment		Mitigation Strategy		Status	
Sub-Category	Item ID	Item Name	Item Description	Severity	Frequency	Impact	Probability	Current Status	Target Status
Vulnerability	Threat score: Power system rules, regulations, and technical standards do not meet current and changing environmental conditions			9					
	Corruption leads to code violations			9					
	Dam construction does not follow design specifications			9					
	Installation does not follow design specifications			9					
	Lack of compliance with codes in design			9					
	System operations are not flexible enough to respond to changes in demand and supply			7	63	63			
	Demand forecasting is not responsive to changing load conditions			7	63	63			
	Heavy power sector reliance on hydro generation			7	49	49	49		
	Inadequate domestic generation capacity requires costly energy imports			7	49	49	49		
	Limited functionality in dispatch planning software			7	49	49	49		
	Hydro generation reservoir is too small for drought conditions			7	49	49	49		
	Large industry (mining, cement, and economic zones) constitutes approx 40perc of demand and revenue			7	63	63			
	Poor coordination between dam operators			7					
	Transmission infrastructure located in wildfire prone areas			7	49	49			
	Transmission equipment located in zones prone to flooding			7	63	63			
Transmission equipment located in zones prone to landslides			7	63	63				
Transmission equipment susceptible to lightning strikes			7						
Transportation impacts occur with power sector impacts			7	63	63				
Unavailable and/or inadequate meteorological, hydrological, and climate change data for decision making			7	63	63				
Civil works occur near transmission infrastructure			5						
Distribution equipment located in zones prone to landslides			5	45	45				
Distribution equipment located in zoneze prone to flooding			5						
Distribution equipment susceptible to lightning strikes			5						
High levels of turbidity and siltation affect hydro generation			5	45	45				
Communication and SCADA systems between power system components lack certain functions			5						
Limited number of skilled workers to carry out daily activities			5	45	45				
Critical staff may be unavailable during extreme events			5						
Theft of power and power system equipment is common			3						
Population's reaction to extreme weather results in power unpredictable loads			3	27	27				
Animals access to distribution lines			1	21	21				
Animals nest on power system assets			1						
Hunting and shooting in proximity to infrastructure			1						
Trees are close to distribution lines			1						
Vulnerability Scores				9					
Extreme Precipitation				7					
Extreme Temperatures				7					
Flooding				7					
Landslides				7					
Wildlife interactions				5					
Wind				5					
Human Actions: Bad Actors				5					
Human Actions: Accidents				5					
Technological Design				5					
Technological Materials				5					
Technological Workmanship				5					
Drought				5					
Lightning				1					

# Non-climate hazards and current likelihood scores

- Wildlife interactions Medium
- Human: Bad actors Medium
- Human: Accidents Medium
- Technological: Poor design Medium
- Technological: Poor materials Medium
- Technological: Poor workmanship Medium

# Climate hazards and current likelihood scores

- Extreme precipitation High
- Extreme temperatures Medium-high
- Flooding Medium-high
- Landslides Medium-high
- Wind Medium
- Drought Medium
- Lightning Low

**Mr. Sithisakdi Apichatthanapath**  
**USAID Regional Development Mission for Asia**  
**Athenee Tower, 25th Floor**  
**63 Wireless Road, Patumwan**  
**Bangkok, Thailand**  
**Tel: +66 2257 3000**  
**Email: [sapichatthanapath@usaid.gov](mailto:sapichatthanapath@usaid.gov)**

**Ms. Dana Kenney**  
**USAID Clean Power Asia**  
**Abdulrahim Place, Suite 501**  
**990 Rama IV Road**  
**Bangrak, Bangkok 10500**  
**Tel: +66 2026 3065**  
**Email: [Dana\\_Kenney@abtassoc.com](mailto:Dana_Kenney@abtassoc.com)**



**USAID CLEAN POWER ASIA**