

Stockpiling Sunlight:

Why the U.S. Military Cares

Miranda AA Ballentine
President, the Ballentine Group Advisors



A story to kick us off...



Source: U.S. Air Force



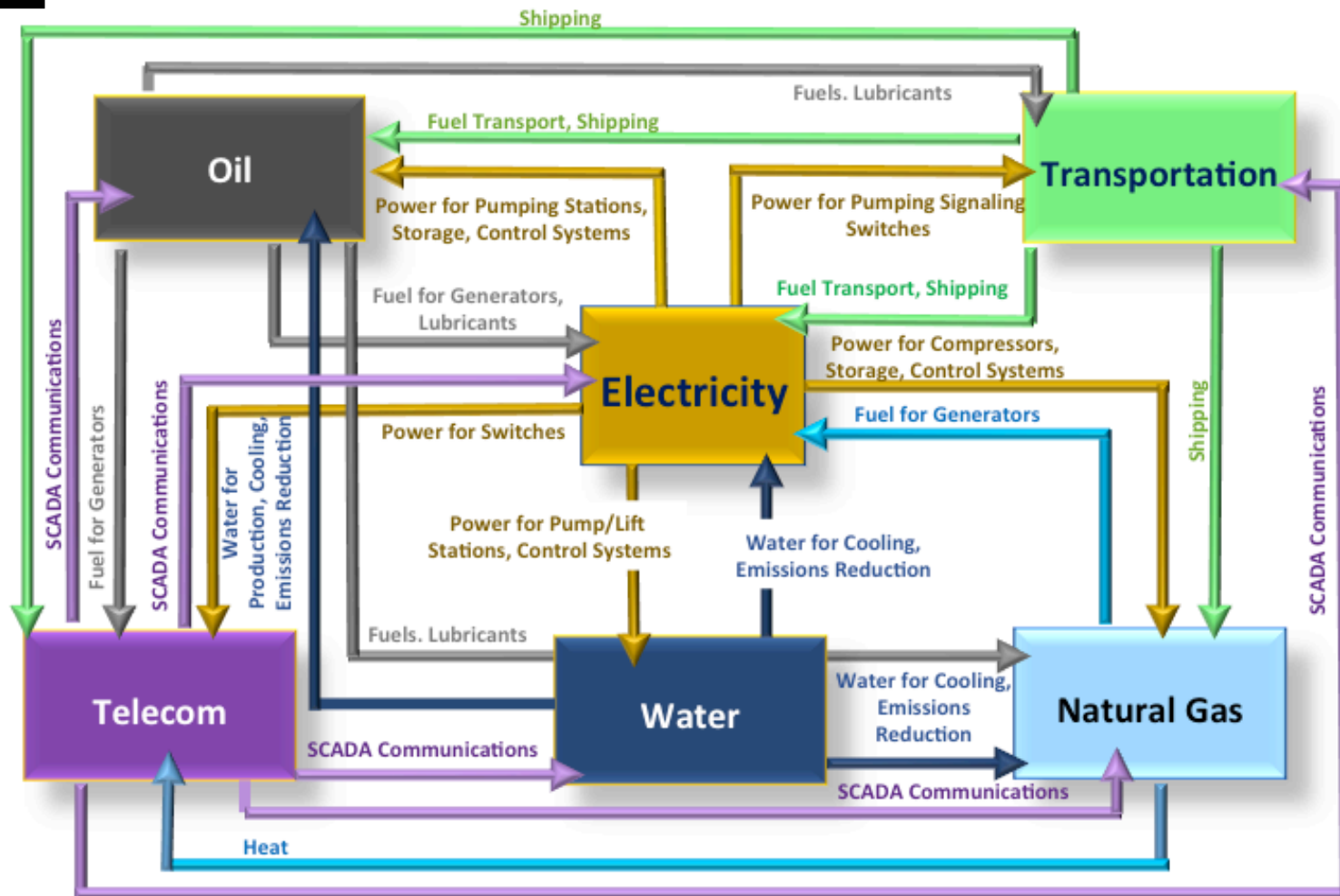
3 trends have left us vulnerable



1 Outsourcing of power generation

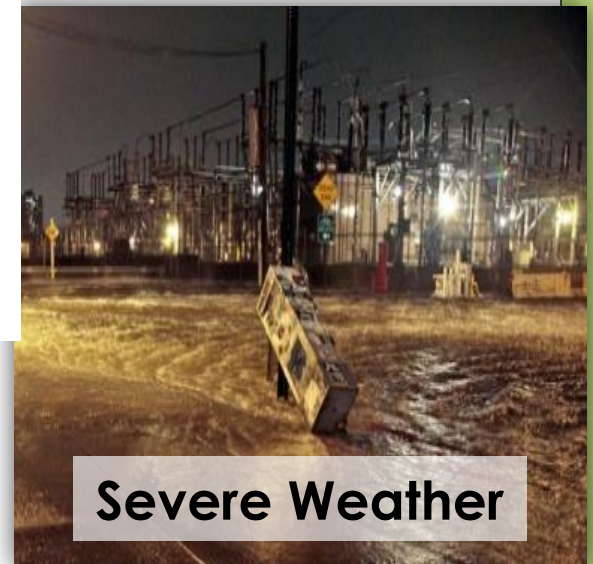


2 increasing reliance on electrons for every part of our economy and military mission



Source: Department of Energy

a dramatic change in threat environment



Source: North American Electric Reliability Corporation (electricity subsector coordinating council)



Threat	Intensity	System Components					
		Electricity Transmission	Electricity Generation	Electricity Substations	Electricity Distribution (above)	Electricity Distribution (below)	Storage
		Assessment of Risk & Resilience					
Natural/Environmental Threats							
Hurricane	Low (<Category 3)	●	●	●	●	●	●
	High (>Category 3)	●	●	●	●	●	●
Drought	Low (PDSI> -3)	●	●	●	●	●	●
	High (PDSI<-3)	●	●	●	●	●	●
Winter Storms/ Ice/Snow	Low (Minor icing/ snow)	●	●	●	●	●	●
	High (Major icing/ snow)	●	●	●	●	●	●
Extreme Heat/Heat Wave		●	●	●	●	●	●
Flood	Low (<1:10 year ARI)	●	●	●	●	●	●
	High (>1:100 year ARI)	●	●	●	●	●	●
Wildfire	Low (>Type III IMT)	●	●	●	●	●	●
	High (Type I IMT)	●	●	●	●	●	●
Sea-level rise		●	●	●	●	●	●
Earthquake	Low (<5.0)	●	●	●	●	●	●
	High (>7.0)	●	●	●	●	●	●
Geomagnetic	Low (G1-G2)	●	●	●	●	●	●
	High (G5)	○	●	○	●	○	●
Wildlife/Vegetation		●	●	●	●	●	●
Human Threats							
Physical	Low	●	●	●	●	●	●
	High	●	●	●	●	●	●
Cyber	Low	●	●	●	○	○	
	High	○	○	○	○	○	○
Electromagnetic	Low (Ambient EMI)	●	●	●	●	●	●
	High (NEMP & HEMP)	●	○	○	●	●	○
Equipment Failures		●	●	●	●	●	●
Combined Threats		○	○	○	○	○	○
Key to Symbols							
Level of Risk		Dimensions of Risk		Current Status of Risk Management Practice			
Low		P – Probability		○ – Nascent: critical vulnerabilities exist			
Moderate		V – Vulnerability		◐ – Established, but opportunities for improvement remain			
High		I – Impact		● – Well-established and robust			
Unknown		R – Risk					

High degree of certainty and preparedness

High degree of uncertainty and lack of preparation

Source: Department of Energy Quadrennial Energy Review



How do we solve it?

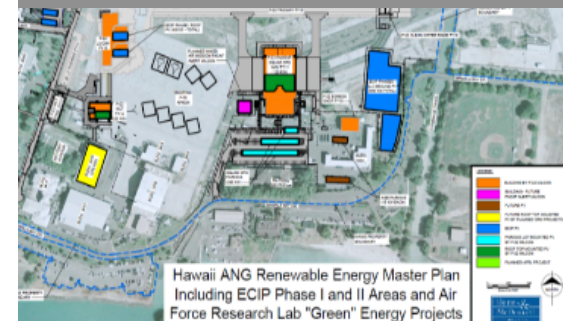
UNDERSTAND OUR VULNERABILITIES and ADAPTIVE CAPABILITIES



SCALE RESILIENCE and PROTECT & DEFEND



RAPIDLY DEPLOY GAME CHANGING TECHNOLOGIES





“ Growing demand for reliable electric power will drive the need for more resilient, more efficient, and more distributed electric power generation systems. Today, a critical hindrance to intermittent energy sources fulfilling this need is energy storage.”

—Center for Naval Analysis. Military Advisory Board



You can take the gal out of Walmart, but you can't take "everyday low prices" out of the gal...





Questions?

