

GUAM ENERGY SYSTEM RESILIENCE



Why is Guam reliant on imported fuel? With no indigenous fossil energy resources, Guam is reliant on imported fuel for their energy and transportation needs, with most of the imported fuel coming from Asia. The Guam Power Authority (GPA) is a public-power utility and autonomous agency of the government of Guam.



What are the five major energy policies in Guam? These include wholistic energy strategies; grid-tied and distributed renewable energy, energy efficiency and conservation, transportation; climate change and resilience; and equity, workforce, and environmental justice ((Guam Legislature n.d.; United Nations n.d.), unless otherwise noted). This list does not include military related policies.



Does Guam need to retire power plants? Guam Power Authority is challenged by the need to retire power plants while reliably and affordably delivering power to its customers. The settlement of an EPA Clean Air Act violation requires GPA to retire older fossil-based generating plants while Renewable Portfolio Standards mandate a transition to carbon-free electricity.



What is Guam's energy policy? In 2019, P.L. 35-46 raised the RPS to 50% net electricity sales by December 31, 2035, and 100% by 2045. Regulations are described in Guam Code ? 8311. GPA's Clean Energy Plan (2022 Integrated Resource Plan) roadmaps a path to 100% clean, reliable, resilient, affordable energy by 2045 and builds upon the 2008 IRP.



Why does Guam need fossil fuels? Due to geographic isolation and lack of local energy supply, Guam depends on imported fossil fuels to meet all its energy needs. Liquid fuel supply chains are vulnerable to physical, political, and cybersecurity threats as well as market conditions, which can result in supply uncertainty, price volatility, and high energy costs.

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How many Customer-Sited distributed energy resource systems are there in Guam? Over 2,000 customer-sited distributed energy resource (DER) systems represent significant assets to Guam's renewable energy (RE) generation. Nearly 22 MW of DER generation capacity accounted for 2.6% of total generation/sales and 23% of total RE generation/sales in 2021 (see Table 6).



Arizona State University: \$999,999 to develop sensor data analytics software tools for advanced monitoring and control of power systems with DERs, addressing uncertainties induced by system and weather conditions. Guam Power Authority: \$1,000,000 to create a cloud-based real-time monitoring tool to detect and locate grid oscillations and other



1.1 Defining Resilience. Resilience is a widely used term among several fields, and its adoption is not recent. In material sciences, resilience is studied as a mechanical property for at least 200 years []. This term was firstly adapted as a system feature in 1973 by Holling, in his work addressing ecological systems []. Holling developed an idea that resilience is associated ???



Devised by Arup, the Energy Resilience Framework (ERF) is a tool to help energy system owners, as well as operators, generators, consumers, investors and regulators, assess how resilient a business and energy system is to challenges ranging from climate change to digital disruption. Operators can use the framework to identify how



provide Guam energy officials and infrastructure owners and operators with a concise overview of energy sector risks. The charts, graphs, and data points included may ANNUAL ENERGY PRODUCTION support Guam's energy security planning efforts or the development of applications grid resilience funding opportunities.

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The Guam Tropical Energy Code (GTEC), adopted and signed into law (P.L. 35-145) on January 2021, establishes minimum energy-efficiency requirements in the design and materials used in construction, reducing the energy needed and lowering energy costs for households in the long-term accordance with GTEC, new construction for all housing in Guam will incorporate ???



Sizing Synchronous Condensers for GPA System BREAK Guam Energy Security Plan Energy Security & Grid Resilience to Climate Change Brian San Nicolas Dan Rueckert, P.E., CISA James Rosenberg II Ashton Raffety Charles Doktycz, Ph.D. MAGELLAN. GRID TRANSFORMATION & DIGITAL TRANSFORMATION



The CEMP is a balanced plan including targets for renewable energy, energy resilience and security, energy efficiency, grid transformation, energy affordability, digital transformation, and transportation electrification. The CEMP is comprised of the following volumes or topic areas: Volume 1 ??? Generation System Reliability, Adequacy and



Goal: Achieve 50% electricity sales from renewable energy by 2035 and 100% by 2045. Objectives: Enhance energy system resilience, improve energy justice, and support ongoing/future planning efforts. Project Scope: Includes stakeholder ???



Energy System Resilience. With decades of experience in energy system recovery evaluation and resilience planning, NREL has developed replicable methodologies for assessing resilience postures and is developing ???

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OE supports critical grid system research???such as this funding???to strengthen grid resilience, help mitigate grid disturbances, and integrate renewable energy and distributed energy resources to accelerate our evolution into a more flexible, socially equitable, and secure grid of the future. Guam Power Authority, Mangilao, Guam



WASHINGTON, D.C. ??? Today, the U.S. Department of Energy (DOE) announced the Energy Transitions Initiative Partnership Project (ETIPP), a new partnership that will provide resources and access to on-the-ground support for remote and islanded communities in the United States seeking to transform their energy systems and lower their vulnerability to ???



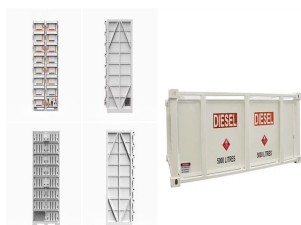
The Guam Energy Office is a small line agency within the Executive Branch of the Government of Guam. energy exploration and production in order to maintain the Nation's position as a global energy leader and foster energy security and resilience for the benefit of the American people. The Guam Energy Office sponsored solar systems



Guam, a U.S. territory located in a string of Western Pacific islands known as Micronesia, currently meets its energy needs in the form of imported fossil fuels and intermittent renewable energy. Its goal is to generate 100 percent of ???



By utilizing renewable energy sources and electrochemical energy storage, the life-cycle cost of energy within microgrids connected to the electrical grid can be significantly reduced. Moreover, the book explores how the design of microgrids can enhance the resilience of power supply to customers, as measured by the duration for which the



The U.S. Department of Energy's Grid Deployment Office (GDO) works to expand access to affordable, reliable, clean electricity by maintaining and investing in critical power generation facilities (such as hydropower and nuclear energy), increasing grid resilience, and improving and expanding

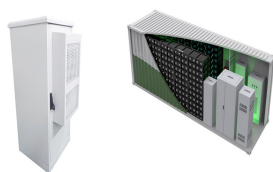
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transmission and distribution systems.

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As GPA integrates more renewable energy to meet Guam's clean energy goals, efficient tools and methods will be needed to ensure the reliability and resiliency of the grid, GPA said in a press



Guam Guam Constructs a backup power generation system and a 12 MW Battery Energy Storage System (BESS) A Polaris Point, Naval Base Guam (NBG). The of work construction and of an Industrial Control (ICS) monitoring improve operational reliability and power (ESS) at Polaris Point. power This control system (PCMS) (13) will be implemented that



Fort Liberty (Bragg) NC Fort Bragg Emergency Water System \$7,705 Navy P696 Naval Base, Guam Guam Inner Apra Harbor Resiliency Upgrades (Phase I) \$38,300 FY 2022 Energy Resilience and Conservation Investment Program FY22 Total Funding. Component Project No. Location State Project Title Project Cost (\$000)



Guam's Priority Climate Action Plan (PCAP) serves to increase the island's resilience to climate change by presenting a baseline greenhouse gas (GHG) inventory of priority sectors and a priority list of GHG reduction measures ???



(Fadian, Guam) ??? As the Guam Power Authority (GPA) integrates more renewable energy to meet Guam's clean energy goals, efficient tools and methods will be needed to ensure the reliability ???



residential and 100 kW for nonresidential systems ??? Guam Green Growth, a public-private partnership led by University of Guam's Center for Island Sustainability, includes working groups, an innovation invest in energy efficiency and resilience. ??? Guam Power Authority (public electric

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utility provider): <https://>

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Guam Power Authority participated in the 3rd Annual Territorial Climate and Infrastructure Workshop hosted by The Department of the Interior Office of Insular Affairs, GPA announced recently in a



The surplus power is distributed on the island's grid. 66 All new net metering systems connected to the grid after June 2020 are required to have energy storage batteries "Guam Power Authority bolsters resilience and charts path to 50% renewables," American Public Power 28 Guam Energy Office, Fuel and Power Data Compilation, 2021



Based on the resilience theory, the SD model of CES is described. We simulated and calculated the system resilience under 17 different scenarios, analyzed the key factors affecting the energy system resilience, and discussed the energy system resilience under different energy transformation paths. The research conclusions are as follows: (1)

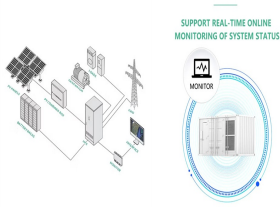


Mighty Waves Energy | PROPRIETARY + CONFIDENTIAL About Us Founded in February 2022 Approx. \$4.5 million revenue to date Owner funding and Government Contracts ??? no debt Delaware, C Corp. Maryland and Virginia. 6 Employee s Major Subcontractors: Gibbs and Cox, Nottingham Spi rk Developed, tested and validated designs with IP Customer demand; Unique ???

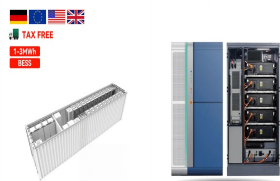


tions. A high energy system resilience is of utmost importance to modern societies that are highly dependent on continued access to energy services. This review covers the terminology of energy system resilience and the assessment of a broad landscape of threats mapped with the proposed framework. A more detailed discussion on

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6 ? The study will also provide the tools to ensure energy system resilience against extreme weather events, improve energy justice, and guide GPA in its investments in modern, intelligent, and