

St. Kitts and Nevis: Energy Transition & Sustainable Development

Pursuing 100% Renewable Electricity by 2035

Presented By: Dr. Elrick Francis, Director, Department of Environment.
Country Status Presentation for the 2026 CTCN • UNITAR • KIER Energy
Storage System Learning Visit.

Why Energy Transition Matters for St. Kitts and Nevis



CURRENT ENERGY REALITY



~95% of electricity is fossil fuel-based.



Heavy reliance on imported diesel.



Exposure to volatile fuel prices.



Vulnerable to supply chain disruptions.



THE TRANSITION PATHWAY

1



Imported Fuel Dependency

2



High Economic & Energy Risk

3



Energy Transition

4



Renewable & Resilient System



NATIONAL OPPORTUNITY



Abundant Solar Energy



Wind Energy



Geothermal Energy



Energy Storage Systems



Energy Transition = Economic Security + Climate Resilience + Sustainable Development

National Energy Transition Vision: 100% Renewable Electricity by 2035

Five Strategic Pillars



Renewable Energy Expansion

Utility-scale Solar PV, Wind, Geothermal, and distributed generation.



Energy Storage Deployment

Utility-scale and distributed battery systems for grid flexibility and resilience.



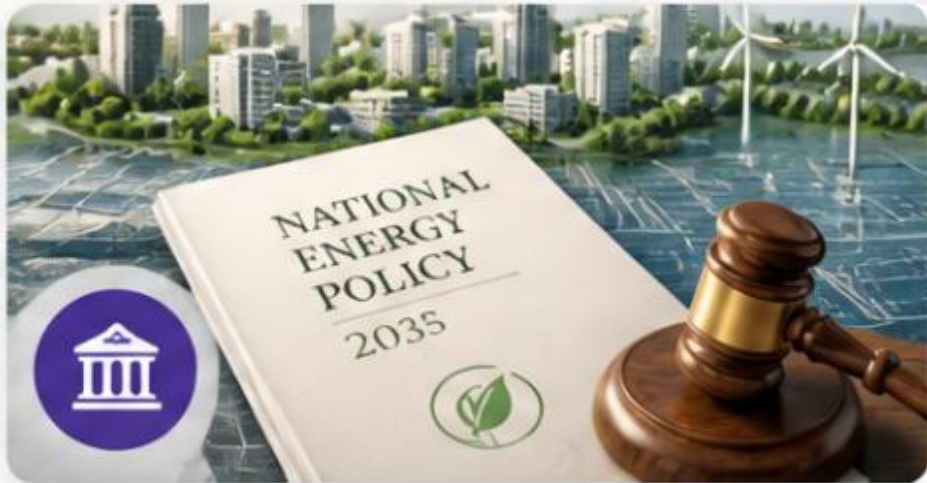
Grid Modernisation

Implementing Smart Grids, Advanced Metering, and digital energy systems.



Transportation Electrification

Promoting EV adoption, building charging infrastructure, and enabling renewable-powered mobility.



Governance Reform

Establishing a modern regulatory framework including a new National Energy Policy and Federal Energy Commission.



Expected Outcomes:



Energy Security



Decarbonisation



Sustainable Growth

Current Energy System Snapshot: Where We Are Today

⚡ Electricity Utilities



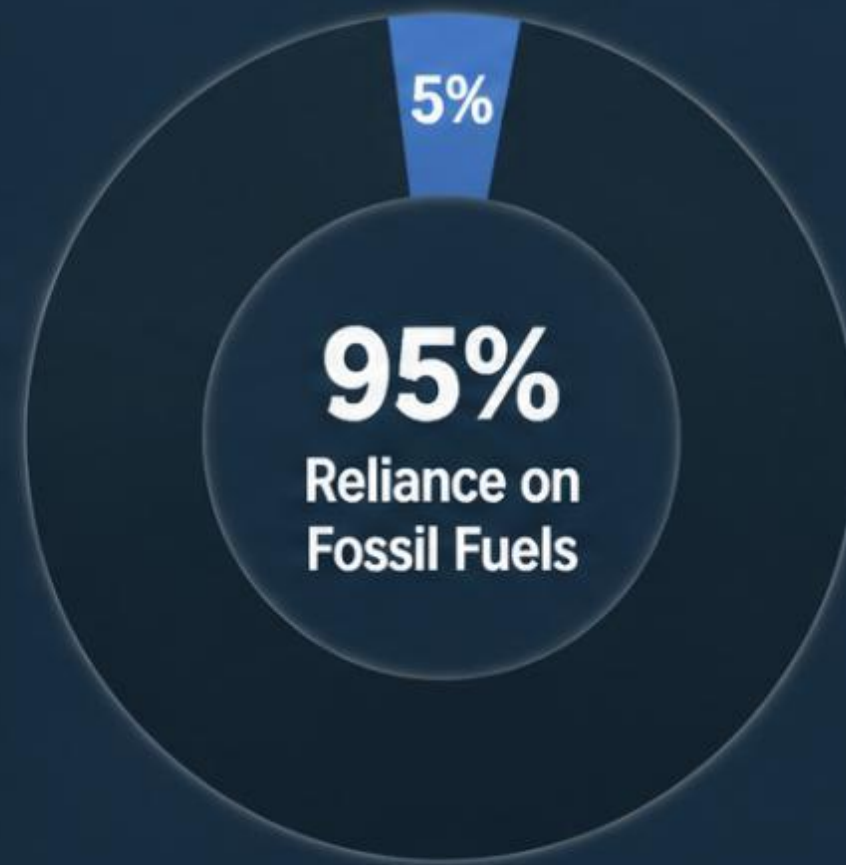
SKELEC

Serves St. Kitts with generation, transmission, and distribution.



NEVLEC

Serves Nevis with generation, transmission, and distribution.



Diesel & Other
Fossil Fuels

95%



Wind Energy

5%

⚠️ Key Challenges



Imported Fuel
Dependence



Volatile Fuel
Prices



Small Island
Grid
Constraints



Climate
Vulnerability



High
Infrastructure
Costs



This 95% reliance on fossil fuels creates one of the largest opportunities for renewable energy and ESS deployment in the Caribbean.

Renewable Energy Resource Advantage

The Foundation of Our Energy Transition



SOLAR ENERGY

With high year-round solar irradiation, it is our lowest-cost renewable resource, ideal for rapid, distributed deployment.



WIND ENERGY

The planned 6.6 MW Belle Vue Wind Farm will diversify our renewable portfolio and complement our solar generation profile.



GEOHERMAL ENERGY

Located on Nevis, this strategic resource provides 24/7 renewable baseload energy, ensuring energy sovereignty.



KEY MESSAGE: Unlike many island nations, St. Kitts and Nevis possesses a diversified renewable portfolio (Solar + Wind + Geothermal + ESS) capable of delivering both variable and baseload power.

Major Projects Driving the Energy Transition

Building the Foundation for 100% Renewable Electricity

	50 MW Solar + BESS Project	CAPACITY / SCOPE 50 MW	 STRATEGIC PURPOSE Utility-scale renewable generation and storage
	Vaughans Geothermal Project	CAPACITY / SCOPE 10 MW (Phase I)	 STRATEGIC PURPOSE Renewable baseload generation
	Belle Vue Wind Farm	CAPACITY / SCOPE 6.6 MW	 STRATEGIC PURPOSE Renewable diversification
	Taiwan Green Energy Demo Project	CAPACITY / SCOPE Solar + BESS + Smart Grid	 STRATEGIC PURPOSE Technology demonstration and capacity building
	SKN-100 Programme	CAPACITY / SCOPE National Programme	 STRATEGIC PURPOSE Decarbonisation and institutional reform



Our strategy combines large-scale renewable projects, transformative geothermal development, and integrated technology demonstrations to build a resilient and secure energy future.

Energy Storage Systems: The Critical Enabler

For St. Kitts and Nevis — connecting renewables, reliability, and resilience.



The Challenge

As variable renewables like solar and wind increase, our small island grid faces stability challenges due to fluctuating power output and limited flexibility.



The ESS Solution

-  Improves Grid Reliability and Stability
-  Integrates More Renewables by storing excess energy
-  Boosts Climate Resilience with backup power
-  Enhances Energy Security by reducing diesel use

National Priority			How ESS Contributes	
	Solar & Wind Energy	>		Energy shifting and variability management
	Smart Grid	>		Provides essential grid flexibility
	Climate Resilience	>		Enables emergency backup capability



Key Message: For St. Kitts and Nevis, Energy Storage Systems are not optional. They are the technology that connects renewables, reliability, and resilience into one functioning system.

Where Do We Need Energy Storage Systems?

National ESS Deployment Roadmap

1 Utility-Scale ESS



Purpose

Support large-scale renewable energy integration

Applications

-  50 MW Solar PV + Battery Storage Project
-  Future Wind + ESS Integration
-  Future Geothermal + ESS Optimisation
-  Grid Stability Services
-  Reserve Capacity

Expected Benefits

-  Renewable integration
-  Frequency regulation
-  Peak shaving
-  Reduced diesel generation

2 Distributed ESS



Purpose

Support distributed generation and customer participation

Applications

-  Residential Solar + Battery Systems
-  Commercial Storage Systems
-  Community Energy Projects
-  Net Billing Support

Expected Benefits

-  Self-consumption of solar energy
-  Reduced electricity bills
-  Backup power
-  Prosumer participation

3 Critical Infrastructure ESS



Purpose

Climate resilience and emergency preparedness

Priority Facilities

-  Hospitals
-  Emergency Shelters
-  Water Production Facilities
-  Government Operations Centres
-  Communications Infrastructure

Expected Benefits

-  Disaster resilience
-  Emergency operations
-  Service continuity
-  Reduced outage impacts

4 Future ESS Applications



Purpose

Emerging Areas

-  EV Charging Infrastructure
-  Microgrids
-  Smart Communities
-  Long-Duration Storage
-  Hydrogen Integration

Research Opportunities

-  Vehicle-to-Grid (V2G)
-  Grid flexibility
-  Advanced storage technologies
-  Island energy-system optimisation



Key Message: The question for St. Kitts and Nevis is not whether ESS is needed. The question is how quickly ESS can be deployed at utility, community, and critical-infrastructure scales.

National System of Innovation (NSI)

Building the Ecosystem for Energy Transformation



National Energy Innovation Ecosystem

A collaborative flow from Government & Policy Leadership, through the Energy Unit, Utilities, Universities, Private Sector, and Development Partners, culminating in Renewable Energy Deployment & ESS Innovation.



Current Areas of Innovation



Solar PV Development



Wind Energy Development



Geothermal Development



Smart Grid Development



Energy Storage Systems



Transport Electrification



Sustainable Island State Agenda



Current Capacity Gaps



Limited ESS R&D and testing



Lack of system modelling capability



Gaps in grid integration modelling



Need for more demonstration projects



Limited international research partnerships

National Need → Potential Support



ESS Roadmap

KIER



Technical Assistance

CTCN



Capacity Development

UNITAR



Demonstration Projects

KIER + CTCN



Innovation Partnerships

All Partners



From Technology Adoption → To Research, Development, Demonstration and Innovation

Smart Grid Transformation

Building the Digital Foundation for a Renewable Energy Future



Where We Are Today



Advanced Metering Infrastructure (AMI)



Smart Meter Deployment



Utility Digitalisation



Grid Modernisation



Renewable Energy Planning Tools



Advanced Monitoring Systems



Why Smart Grids Matter

Small island grids have limited flexibility and high renewable integration challenges. Smart Grids offer improved reliability, greater renewable penetration, better ESS utilisation, and enhanced resilience.



Renewable Energy + ESS + Smart Grid = **The Future Energy System**



Future Smart Grid Capabilities



Real-Time Grid Visibility
(Monitoring, Forecasting)



ESS Optimisation
(Control, Balancing, Services)



Renewable Integration
(Forecasting, Dispatch)



EV Integration
(Smart Charging, Demand Management)

TRADITIONAL GRID

One-Way Power Flow



1. POWER PLANT
Generates electricity



2. TRANSMISSION
High-voltage power transport



3. DISTRIBUTION
Power delivered to neighbourhoods



4. CONSUMERS
Electricity used by homes and businesses

VS.

SMART GRID

Two-Way Power Flow



RENEWABLE ENERGY
Wind, solar, hydro etc.



SOLAR ENERGY
Real-time generation



MICRO ENERGY
Markets & resources



ENERGY STORAGE
Store excess energy for later use



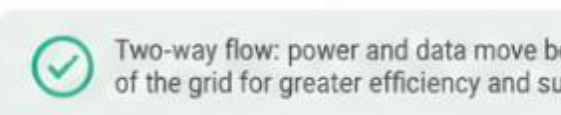
DIGITAL MANAGEMENT
Monitoring, analytics & control



ELECTRIC VEHICLES
Smart charging & grid support



DISTRIBUTION NETWORK
Intelligent distribution self-healing



CONSUMERS & BUSINESSES
Use and/or sell excess back to the grid



One-way flow: power moves from the plant to consumers.



Two-way flow: power and data move between all parts of the grid for greater efficiency and sustainability.

Transportation Electrification

Reducing Fuel Dependence Beyond the Power Sector



Why Transport Matters

Transportation remains heavily dependent on imported fuels, creating challenges like:



Fuel import dependence



Exposure to global oil prices



Transportation emissions



Foreign exchange leakage



National energy-security risk



DRIVE Initiative

The Decarbonised Roadway Initiative for Vehicle Electrification focuses on EV promotion, charging infrastructure, and sustainable mobility planning.

Measure



Import Duty
on Eligible
EVs

Change

45%
→ 10%

Effective:
1 May 2026



Future Opportunities for ESS

ESS can be integrated with transportation through:



Solar-Powered
Charging Stations



Battery-Backed
Charging Infrastructure



Smart Charging
Systems



Vehicle-to-Grid
(V2G) Research



Transportation Electrification = Energy Security + Decarbonisation + New ESS Opportunities

Opportunities for Collaboration with KIER

Accelerating ESS Deployment and Energy-System Innovation



Proposed Technical Cooperation



Energy Storage Systems: Sizing, performance evaluation, lifecycle analysis.



Renewable Energy Integration: Solar/Wind/Geothermal + ESS optimisation, forecasting tools.



Smart Grids: Grid modelling, advanced energy management, AI applications.



Critical Infrastructure Resilience: Protection strategies and resilience planning for energy systems.



Potential Joint Demonstration Projects



National ESS
Integration
Roadmap



Community
Solar +
Battery Microgrid



Geothermal +
Storage
Integration Study



Critical
Infrastructure
Resilience Hub



Smart Grid &
Battery Storage
Demonstration
Platform



Strategic Value for Both Parties



What St. Kitts and Nevis Gains:

- ✓ Technical Expertise
- ✓ ESS Deployment Experience
- ✓ Research Support & Capacity Development



What KIER Gains:

- ✓ Real-World SIDS Test Bed
- ✓ Geothermal + ESS Research Opportunities
- ✓ International R&D Collaboration Platform

St. Kitts and Nevis as a Living Laboratory for ESS Innovation in Small Island Developing States

Scaling Impact Through International Cooperation

Technical Assistance, Capacity Development and Institutional Strengthening

CTCN Support



Technical Assistance

National ESS Roadmap, Grid Integration Studies, Smart Grid Strategy.



Technology Transfer

Access to global best practices and expertise.



Innovation

Support for pilot projects and emerging energy tech.

UNITAR CIFAL Jeju



Leadership Development

Energy governance, sustainable development.



Technical Capacity Building

ESS policy, energy planning, project development.



Institutional Strengthening

For government, utilities, and regulators.

Priority Needs

PRIORITY AREA

IMPORTANCE



Utility-Scale
ESS

Critical



Geothermal +
ESS

High



Smart Grid
Dev.

High



Critical Infra.
Resilience

High



Key Message: CTCN can help us access technology and technical assistance. UNITAR can help us build the human and institutional capacity. Together, they can accelerate implementation of the National Energy Policy 2035.

Proposed RD&D Collaboration Pipeline

St. Kitts & Nevis • KIER • CTCN • UNITAR



A strategic flow from Current Projects to Technical Assistance, R&D, Demonstration, Investment Readiness, and finally National Scale-Up to achieve 100% Renewable Electricity by 2035.

**Phase 1: Immediate**
(2026–27)

**National ESS Roadmap**

**Grid Integration Studies**
(Solar, Wind, Geothermal)

**National Energy System Modelling**

**Phase 2: Demonstration**
(2027–30)

**Resilient Critical Infrastructure Hub**

**Community Solar Microgrid**

**Geothermal + Storage Demo**

**Smart Grid Demo Platform**

**Phase 3: Scale-Up**
(2030–35)

**Long-Duration Storage**

**Vehicle-to-Grid (V2G)**

**AI-Assisted Grid Management**

**SIDS Knowledge Platform**



Why St. Kitts and Nevis?

A Living Laboratory for Energy Storage Systems in SIDS



Unique Resources



High Solar Energy Potential



Commercial Wind Development



Significant Geothermal Potential (~1,280 MW)



ESS as a central transition strategy



Integrated Transition Underway



100% Renewable Target by 2035



50 MW Solar PV + Battery Project



Geothermal Development Programme



Smart Grid Modernisation



Electric Mobility Transition



Ideal for R&D



Study high-renewable island grids



Test Geothermal + Storage systems



Model climate-resilient infrastructure



Demonstrate smart-grid applications in real-world SIDS conditions



St. Kitts and Nevis offers a [real-world environment](#) for developing, testing, demonstrating and scaling ESS solutions for Small Island Developing States.

Key Takeaways and Way Forward

Building the Future Energy System of St. Kitts and Nevis

Today

- ✓ ~95% Fossil Fuel-Based
- ✓ Small-Island Grid Challenges
- ✓ Exposure to Climate Risks
- ✓ Dependence on Imported Fuels

Vision for 2035

100% Renewable Electricity Powered by:



What We Need to Get There

- ✓ ESS Deployment
- ✓ Smart Grid Integration
- ✓ Technical Innovation
- ✓ Research & Demonstration
- ✓ Capacity Building
- ✓ Strategic Partnerships
- ✓ Investment Mobilisation

Why ESS Matters



Call for Collaboration

St. Kitts and Nevis is ready to serve as a living laboratory for innovative Energy Storage System solutions and renewable-energy integration in Small Island Developing States. We welcome collaboration with KIER, CTCN, UNITAR and international partners to accelerate this transformation.

