



Achieving a rapid decarbonization of the energy sector in Saint Kitts and Nevis

Part I: Project Information

GEF ID

10856

Project Type

FSP

Type of Trust Fund

GET

CBIT/NGI

CBIT No

NGI No

Project Title

Achieving a rapid decarbonization of the energy sector in Saint Kitts and Nevis

Countries

St. Kitts and Nevis

Agency(ies)

UNEP

Other Executing Partner(s)

Ministry of Sustainable Development

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Climate Change, Focal Areas, Climate Change Mitigation, Energy Efficiency, Renewable Energy, Financing, Climate Change Adaptation, Small Island Developing States, Demonstrate innovative approaches, Influencing models, Transform policy and regulatory environments, Strengthen institutional capacity and decision-making, Private Sector, Stakeholders, Capital providers, Financial intermediaries and market facilitators, SMEs, Gender Equality, Gender Mainstreaming, Gender-sensitive indicators, Knowledge Generation, Capacity, Knowledge and Research, Learning, Indicators to measure change, Capacity Development, Knowledge Exchange, Innovation

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 2

Climate Change Adaptation

Climate Change Adaptation 1

Duration

48 In Months

Agency Fee(\$)

315,305.00

Submission Date

10/12/2021

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCM-1-1	GET	1,500,995.00	7,000,000.00
CCM-1-3	GET	1,818,000.00	4,410,000.00
	Total Project Cost (\$)	3,318,995.00	11,410,000.00

B. Indicative Project description summary**Project Objective**

Accelerate the transition towards 100% renewable electricity generation and 100% high energy efficiency public buildings in Saint Kitts and Nevis.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
--------------------------	-----------------------	-------------------------	------------------------	-------------------	-----------------------	--------------------------

1. Policy and institutional arrangements for decarbonizing the electricity sector and enhancing energy efficiency of public buildings	Technical Assistance	1. The Government of St. Kitts and Nevis implements a policy and regulatory framework for achieving its vision of 100% renewable electricity generation and 100% high energy efficiency public buildings	<p>1.1. The Government of St. Kitts and Nevis develops a revised National Energy Policy for achieving 100% renewable electricity generation and 100% public buildings with high renewable or energy efficiency</p> <p>1.2. The Government of St. Kitts and Nevis develops a roadmap and investment plan for implementing the National Energy Policy</p> <p>1.3. The Government of St. Kitts and Nevis has improved institutional mechanisms for achieving the transition towards 100% renewable electricity generation</p> <p>1.4. The Government of St. Kitts and Nevis develops energy efficiency legislation to achieve the goals of the National Energy Policy</p> <p>1.5. The Government of St. Kitts and Nevis develops a knowledge management and monitoring systems for tracking the implementation of the National Energy Policy, roadmap and investment plan</p> <p>1.6. St. Kitts and Nevis government representatives and other key stakeholders demonstrate increased capacity (technical, planning, and regulatory) on a gender-sensitive implementation of the national energy policy, roadmap and investment plan</p>	GET	937,893.00	1,635,333.00
---	----------------------	--	---	-----	------------	--------------

2. Demonstration of feasibility of high energy efficiency buildings and resilient grid-integrated renewable electricity generation	Investment	2. St. Kitts and Nevis generates an increasing share of electricity through renewable energy and have increased resilience and energy efficiency in public buildings	2.1. The government, academia, private sector and civil society stakeholders demonstrate increased awareness of the technical, economic, social and environmental feasibility of resilient high energy efficiency buildings and innovative grid-integrated renewable electricity generation through two pilots on the island of St. Kitts and two on the island of Nevis, based on existing energy audits	GET	1,680,161.00	7,635,333.00
3. Scaling up financing for 100% renewable energy and energy efficient measures	Technical Assistance	3. The Government of St. Kitts and Nevis obtains commitments for increased investments aligned with the revised national energy policy	3.1. Officials in governmental, technical, academic and private institutions demonstrate increased capacity in the development, assessment and appraisal of bankable renewable energy and energy efficiency projects aligned with the National Energy Policy 3.2. The Development Bank of St. Kitts and Nevis has improved financing mechanisms to finance micro, small and medium-sized enterprises (MSMEs) investments in renewable energy and energy efficiency 3.3. Regional and international investors demonstrate increased awareness of the business opportunities in the renewable and efficient energy sector in St. Kitts and Nevis	GET	467,894.00	1,595,334.00
Monitoring and evaluation				GET	75,000.00	
Sub Total (\$)					3,160,948.00	10,866,000.00
Project Management Cost (PMC)						

GET	158,047.00	544,000.00
Sub Total(\$)	158,047.00	544,000.00
Total Project Cost(\$)	3,318,995.00	11,410,000.00

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	Ministry of Sustainable Development	In-kind	Recurrent expenditures	950,000.00
Recipient Country Government	Ministry of Public Infrastructure, Posts, and Urban Development	Public Investment	Investment mobilized	7,300,000.00
Private Sector	Leclanché S.A.	Equity	Investment mobilized	2,960,000.00
Recipient Country Government	Ministry of Finance	Public Investment	Investment mobilized	200,000.00
Total Project Cost(\$)				11,410,000.00

Describe how any "Investment Mobilized" was identified

o During the project, investment will be mobilized through the Ministry of Finance and the Ministry of Public Infrastructure, Posts, and Urban Development, namely: - 11th European Development Fund (EDF) - St. Kitts and Nevis Energy and Energy Efficiency Sector Budget Support (co-financing of USD 200,000), which consists of a grant to promote the integration of renewable energy and energy efficient technology in public facilities. The programme also supports the Government to build resilience within the energy and water sectors, to ensure that the population has access to the basic needs of water and electricity when the country is severely impacted by natural disasters such as hurricanes. Some specific outcomes will include the installation of energy efficient streetlights and the installation of underground electrical power supply to three pumping stations. This investment will be mobilized through the Ministry of Finance under the ambit of the National Authorizing Officer (NAO) with responsibility for EU-SKN engagement. - The Green Climate Fund project FP020, Sustainable Energy Facility for the Eastern Caribbean (funded by the Global Environment Facility, Green Climate Fund (GCF), Japan International Cooperation Agency (JICA), Inter-American Development Bank (IDB)), consisting of grant and loan financing to address the financial, technical, and institutional barriers faced by geothermal energy and to provide institutional strengthening (co-financing of USD 1,200,000 to be disbursed by the Ministry of Public Infrastructure, Posts, and Urban Development). - The Green Climate Fund project "Building Resiliency in the Water Supply Sector in St. Kitts and Nevis", which aims to develop a 7 MW renewable power plant to provide electricity to a water desalinization plant created as part of the project, selling surplus to the electric grid (co-financing of USD 6,100,000 to be disbursed by the Ministry of Public Infrastructure, Posts, and Urban Development); o An equity investment by swiss private company Leclanché S.A. to install a 35.7 MW solar PV farm with 45.7 MWh battery energy storage system (BESS). This project will be the first large scale variable renewable energy power plant in the country and the Caribbean in its entirety. As such, it will be the first private sector experience in the country towards a decentralized, zero-carbon energy grid. The project will therefore contribute to the development of the initial set of regulations to ensure the technical feasibility of the transitioning grid, besides from providing inputs

and lessons learned in all of the dimensions that are relevant for the transition to renewables, i.e. in terms of the technology (e.g. grid integration), logistics, business, institutional arrangements, and social and environmental aspects.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	St. Kitts and Nevis	Climate Change	CC STAR Allocation	3,318,995	315,305	3,634,300.00
Total GEF Resources(\$)					3,318,995.00	315,305.00	3,634,300.00

E. Project Preparation Grant (PPG)PPG Required **true**

PPG Amount (\$)

60,000

PPG Agency Fee (\$)

5,700

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	St. Kitts and Nevis	Climate Change	CC STAR Allocation	60,000	5,700	65,700.00
Total Project Costs(\$)					60,000.00	5,700.00	65,700.00

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	16015	0	0	0
Expected metric tons of CO ₂ e (indirect)	455540	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)				
Expected metric tons of CO ₂ e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	16,015			
Expected metric tons of CO ₂ e (indirect)	455,540			
Anticipated start year of accounting	2023			
Duration of accounting	20			

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)	998,837,401			

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)
Solar Photovoltaic	0.25			



Small 0.15
Hydropower



Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	50			
Male	50			
Total	100	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Part II. Project Justification

1a. Project Description

i) Global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description);

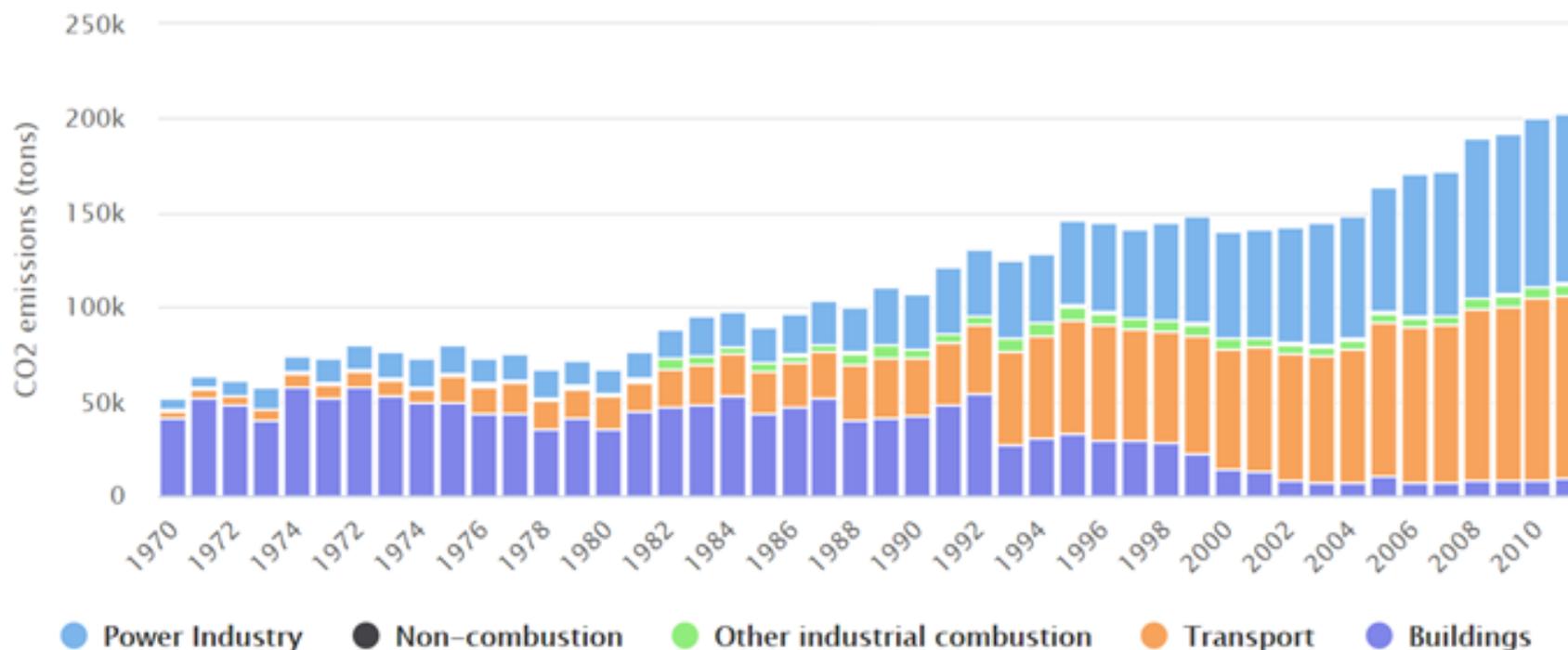
Global environmental problem

To achieve the Paris Agreement targets, the transition to a low-carbon energy sector is critical, as energy accounts for two-thirds of global emissions. Deployment of renewable energy technologies, coupled with energy efficiency gains, can provide an estimated 90% of the CO₂ emissions reductions needed by 2050 while advancing economic growth and development.[1]

Small Island Developing States (SIDS) are committed to the global effort to reduce the rate of global warming as they are expected to be disproportionately more impacted by the effects, even though their contribution to climate change is significantly smaller. The Federation of St. Kitts and Nevis is fully aligned with these commitments. It is ratified signatory to the UNFCCC, the Kyoto Protocol, the Paris Agreement, and subscribes to the sustainable development goals (SDGs). In its intended nationally determined contribution (iNDC of 12th December 2015), St. Kitts and Nevis committed to a 22% reduction of absolute GHG emissions from the business as usual (BAU) scenario in 2025 and a 35% reduction from the BAU scenario in 2030.[2]

Notwithstanding its commitment and ambition, St. Kitts and Nevis continue to depend on fossil fuel combustion for its energy needs. It is estimated that most country emissions come from the energy sector, mainly, the power industries and the transport sub-sectors (Figure 1). Although its overall emissions are minute (203,036 tCO₂ in 2016), its per capita emissions are relatively large due to its very small population. Electricity generation is responsible for close to 65% of total GHG emissions, as the country relies almost entirely on diesel generators. As a result, the emission intensity per MWh of the electricity consumed is around 0.56 tCO₂ per MWh generated, above the global average of 0.47 tCO₂/MWh.[3] The reliance on fossil fuel imports for electricity generation and road transport has a substantial impact on the country's gross domestic product (GDP). Annual expenditures on such imports reach up to 5.2% of the country's GDP.[4] Transitioning to clean electricity supply is also complicated by high usage, with adoption of energy efficiency measures slow. Per capita consumption in St. Kitts and Nevis is among the highest of all Eastern Caribbean countries.[5]

Figure 1. Estimated CO₂ emissions by sector in St. Kitts and Nevis[6]



This project will support the country in accelerating decarbonization by transitioning towards a highly ambitious target of 100% renewable energy generation. To achieve this, the Government of St. Kitts and Nevis intends to harness renewable energy sources, namely geothermal, solar, wind and waste. It also aims to reduce consumption through achieving 100% high energy efficiency public buildings. As noted earlier, the grid accounts for approximately 65% of the country's emissions and is therefore the target with the highest potential – especially considering that a decarbonized electricity grid is also a pre-condition for the future decarbonization of the transport sector.

Root causes of the global environmental problem and barriers to change

The root causes and barriers holding Saint Kitts and Nevis from transitioning to a low-emission and climate resilient electricity sector are summarized below. [7] Note that while these barriers are presented as conceptually separate, in practice they are often interdependent, reinforcing, and inseparable. This is the fundamental reason why an integral approach is intended for this project. Moreover, the barriers need to be understood in the context of SIDS, which face specific economic and environmental challenges, including:[8]

- A narrow resource base that deprives SIDS from the benefits of economies of scale
- Small domestic markets and heavy dependence on a few external and remote markets
- High costs for energy, infrastructure, transportation, communication and servicing
- Long distances from export markets and import resources

- Low and irregular international traffic volumes
- Little resilience to natural disasters
- High volatility of economic growth
- Limited opportunities for the private sector and a proportionately large reliance of their economies on their public sector,
- Fragile natural environments

On top of these common challenges affecting SIDS, the following root causes and barriers affecting St. Kitts and Nevis transition to 100% renewable electricity generation and 100% high energy efficiency public buildings are:

1. No overarching, operational vision and insufficient institutional arrangements that foster a transition towards a 100% green grid

1.1. Absence of a consistent, overarching vision that is made operational through a feasible, integrated roadmap

The current National Energy Policy (NEP, 2014) in St. Kitts and Nevis established the goal of a 100% renewable-based electricity grid for the year 2020.^[9] However, the steps, funding, and projects to achieve this were not defined, and by 2020 approximately 95% of the electricity generation still comes from diesel generators.^[10] Additionally, the Nationally Determined Contributions for the Federation of St. Kitts and Nevis (2015) and the National Climate Change Policy (2017) set a different target, requiring that by 2030 50% of the electricity comes from renewable sources.^[11] As for the national energy policy, the NDC does not provide a schedule for achieving the desired transition or overall goal, nor specific proliferation targets for the resource's options. The result is that investors, the utilities, and the Government have mixed priorities on the mandate for increasing renewable energy in the grid or energy efficiency targets, as well as difficulties in assessing progress towards the desired goals. Without a clear guidance on the schedule for adding renewables and the financing required to achieve this, reverting back to conventional fossil fuel plants will be required to prevent dire economic and social consequences. Without a roadmap with a generation expansion plan aligned to a grid integration study for high penetration levels of variable renewable energy (VRE), a strategic projection for addition of new renewables in a stable and reliable grid environment is not possible. Without such information, both the St. Kitts and the Nevis power utilities would be averse to high penetration levels of new renewables as they are unsure of the effects such technologies could have on grid performance.

1.2. Insufficient inter-island coordination on energy issues

The energy sectors on the two islands operate independently, with different institutions and regulatory frameworks, and there is no single or designated regulatory authority in charge of overseeing the entire energy sector at a federal level. Instead, energy matters are the competency of the Ministry of Public Infrastructure, Posts, and Urban Development for the island of St. Kitts, and of the Nevis Island Administration for the island of Nevis, with coordination between the two taking place through informal mechanisms. This barrier further enhances the already challenging issues of scale, as both islands pursue their own goals. Lack of coordination has created challenges for the development of joint projects that would require a larger scale, like the development of geothermal sources; instead, each island is pursuing its own studies and projects. While some topics get legislated twice, regulatory gaps may still persist, with uncertainty surrounding issues such as a potential interconnection of the islands and the arrangements for one of them exporting energy to the other.

1.3. Energy efficiency insufficiently reflected in legislation

The institutional framework of the energy sector is relatively robust and is adequate for the initial stages of a clean energy transition. In April 2011, the St. Kitts Electricity Services Act was passed which resulted in the corporatization of the former Electricity Department into a semi-autonomous utility, the St. Kitts Electricity Company (SKELEC). The Nevis Electricity Company Limited (NEVLEC) is the sole provider of electricity on the island of Nevis and operates as a fully

owned subsidiary of the Nevis Island Administration. Energy generation is regulated in Nevis' *Revised Electricity Ordinance* (2009). While both islands operate with self-regulated, centralized utilities, both have legislations which authorize private generation and provide a degree of flexibility for scaling up each grid.

Energy efficiency, on the other hand, needs an improved legislation and policy framework to facilitate even the initial stages of a clean energy transition. The 2014 National Energy Policy (NEP) sets the mandate to promote energy efficiency and conservation in all sectors through, inter alia, the promotion and implementation of energy audits, the review and amendment of mandatory building codes, and the review of the electricity tariff structures and rates. However, there has been limited progress on this direction, with advances only in undertaking energy audits of public buildings (see barrier 2.2 below). As for the adoption of renewables, the NEP does not provide any specific targets, sectors, or guidelines. The islands are yet to adopt guidelines on labelling of all energy-related products, as well as a mandatory building code and standards applicable to lighting, equipment, motors and appliances. Moreover, no action has yet been undertaken for the preparation and enactment of an energy efficiency legislation nor the electricity tariff structures^[12].

1.4. Lack of transparency and data in the energy sector

St. Kitts and Nevis has well documented challenges in terms of public availability of data in the administration.^[13] The enhancement of this institutional capacity in relation to the energy sector, its legislation and the decisions adopted that apply to it, is among the directions included in the National Energy Policy. However, there has been no progress in the implementation of this requirement,^[14] and there is no strategy to systematically collect, compile, manage and publish sectoral data that would be required for transparency and effective decision-making.

2. Lack of local evidence of and experience with the economic and social viability of low-emission energy solutions

2.1. Insufficient experience with renewable energy generation and its integration into the grid

Despite the goals stated in the present version of the NEP, renewable generation is still marginal in terms of the entire grid. In 2020, six years after the revision of the NEP, 95% of the energy is still produced by fossil fuels; only 1 MW of solar capacity have been installed in St Kitts in 2013, whereas a 2.2 MW wind farm operates in Nevis since 2011. The scaling up of renewables in St. Kitts and Nevis will require focusing on different type of issues, mainly, grid stability (frequency, rotor angle and voltage) in the growing presence of renewable energies. The country has not yet had to confront these topics, which will become more relevant as the clean energy transition progresses. A lack of local companies providing the services needed for significant renewable energy deployment was likewise noted.

2.2. Insufficient awareness regarding energy efficiency measures and regulations

As noted previously, adoption of energy efficiency measures has been slow, with per capita consumption in St. Kitts and Nevis the highest of all Eastern Caribbean countries.^[15] As for other SIDS, energy savings potential lie mostly in air conditioners, residential refrigerators and lighting.^[16] Energy audits were undertaken with the support of the Sustainable Energy Facility for the Eastern Caribbean (Caribbean Development Bank, CDB) on seventeen public buildings and twenty water pumping stations in St. Kitts and Nevis in 2018. However, funding to implement these recommendations has not yet been found. Recommendations from the current NEP such as the adoption of labelling guidelines and mandatory standards for appliances have also not been implemented yet.

There is also an absence of a structured national promotional programme for energy efficiency measures across sectors and specially in the public sector to stimulate market demand and supply dynamics for energy commodities. Although some accompanying promotions are done annually for clean energy and EE during CARICOM energy month, these may not be sufficient to sustain a clean energy products and services market. Particularly poor households might face constraints in putting relevant measures in place to conserve energy or in paying electricity bills. In the Caribbean, single-parent female-headed

households face a higher likelihood of being poor. Therefore, public education on renewables and energy efficiency measures, as well as socially inclusive and gender-responsive residential programmes are needed in line with Sustainable Development Goal 7, to ensure universal access to affordable, reliable and modern energy for all.

2.3. Limited government capacity in terms of planning and regulating in the energy sector

The Ministry of Public Infrastructure, Post and Urban Development has responsibility for the energy sector in St. Kitts. In Nevis, oversight is provided by the Office of the Premier with the Geothermal Advisory Committee, chaired by the Minister of Natural Resources. The ministries of both islands with responsibility for planning, managing, and monitoring the energy sector have small complements of staff to execute the tasks. Moreover, the Ministries are not equipped with the expertise required to assess the contribution of renewable energy technology or the activities required to optimize integration.^[17]

Given the limited technical expertise, the energy sector is left vulnerable in terms of ensuring competent guidance of the ongoing developments, policy formulation, and appraising renewable energies and the impact from an economic, social and environmental perspective. With the intended transition in the energy sector, planning activities, requirements for updates and development of the requisite legislative, policy and policy tools; management of bids and administrative additions of new generators, including regulation; and monitoring and verifying energy data will put considerable pressure on the sectorial capacities. Inadequate staffing can quickly become a bottleneck for a smooth and efficient transition to renewables.

The transition to a green grid will also require coping with infrastructure and logistical issues, including dealing with port facilities, roads to project sites or access to specialty equipment such as cranes for wind turbine deployment. These challenges often increase the risk of renewable energy projects, which ultimately ends up reflecting in its price.

3. Limited financing materialized for renewable energy and energy efficiency.

-

3.1. Limited funding from banks and private actors for the deployment of renewable energies and energy efficiency measures

Local equity and government funding are insufficient to achieve the scale of funding required for a clean energy transition, and access to finance is a challenge for SIDS. In St. Kitt and Nevis, the framework to attract foreign investments into renewables has been scarce and ineffective in attracting the necessary foreign direct investment, and assistance from development banks needs to be channeled in a more dynamic way. While the country has made recent progress in advancing with the private Swiss company Leclanché S.A., significant challenges remain in terms of obtaining funding for both further investment and maintenance of new investments. Both challenges are mutually magnified by the lack of a long-term roadmap for achieving the NEP and an accompanying investment plan, as this provides less clarity to investors on possible opportunities. On a smaller scale, building owners do not have access to sufficient financing to support energy efficiency measures and small renewable energy projects.

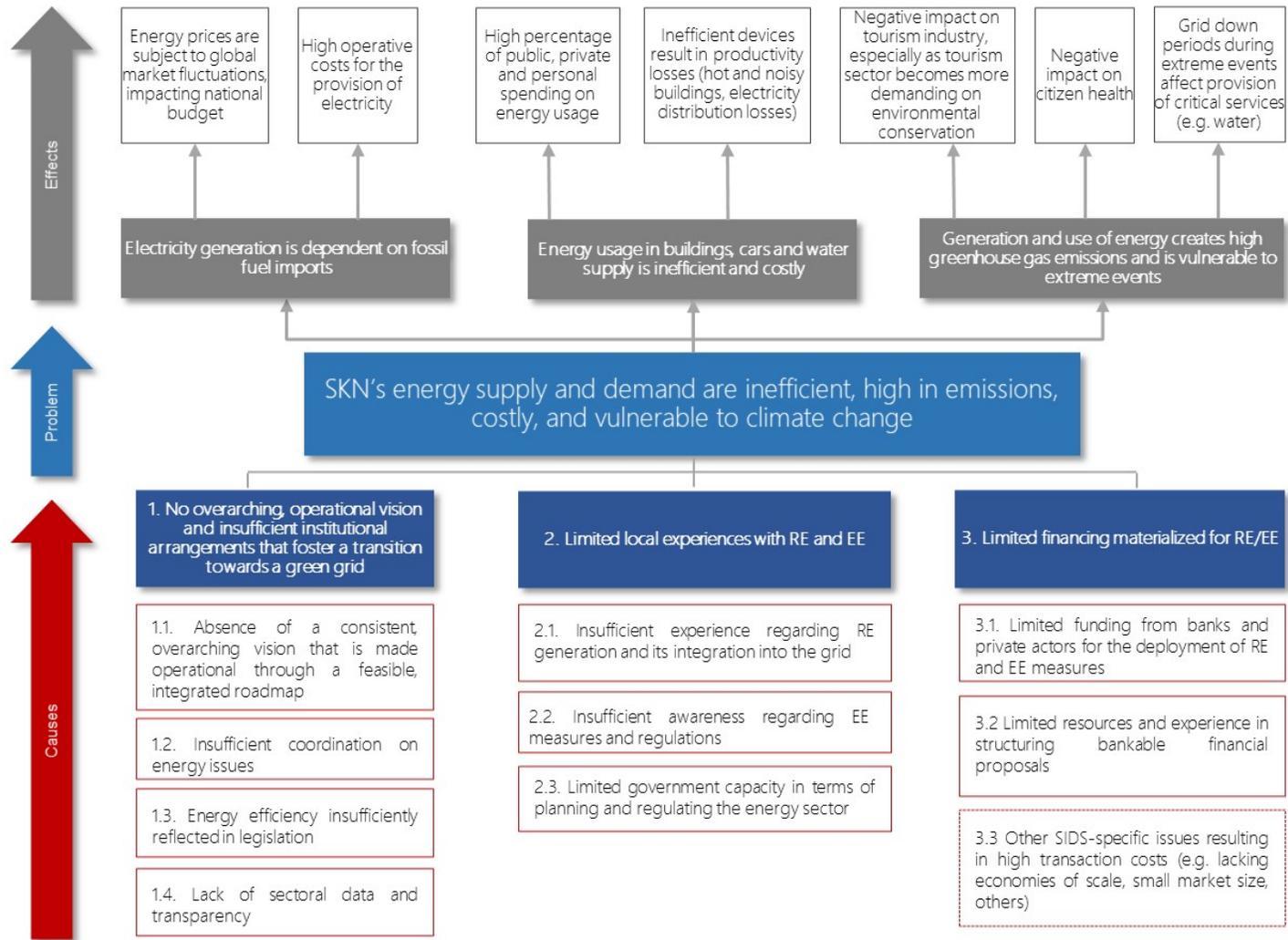
3.2 Limited resources and experience in structuring bankable financial proposals

Before projects can be pursued, adequate preparation must be completed to de-risk future projects to enhance their commercial viability. This is in addition to pursuing the required regulatory reform to ensure that any projects developed will ultimately benefit the general population. International Financial Institutions (IFIs) tend to prefer larger projects over smaller or medium sized, which places SIDS in a disadvantaged position. Moreover, in a number of SIDS the inability of the domestic private sector to supply sustainable energy quality products and services under competitive prices has become a bottleneck for the uptake of sustainable energy markets.^[18] The establishment of bankable Power Purchase Agreements (PPAs) requires high levels of certainty over issues such as connection, guaranteed off-take, predictable long-term revenues and possible curtailment events within an appropriate regulatory framework. This is one of

the key components in establishing a robust development of renewable energy projects.[19] Lack of capacity to develop bankable project proposals for funding is also a significant barrier in St. Kitts and Nevis. For instance, while it is widely accepted that geothermal is the most critical source of renewable energy to support the energy transition, the country is yet to define a proposal that covers all the main angles required by financiers, including legal, environmental, economic, institutional and social points of view.[20] Moreover, a portfolio with concrete proposals at different levels of maturity that can lead to the effective commitment of funds for the deployment of renewable energy projects would be a key input for the roadmap; however, such a portfolio is not yet available.

Summary: project problem tree

Figure 2. Summary of St. Kitts and Nevis barriers and root causes



Note: root cause 3.3. not directly tackled by the project

ii) Baseline scenario and any associated baseline projects

This section provides an outline of the organization, the status, and trends of the electricity sector, along with information that is relevant to contextualize and understand the baseline scenario.

Governance of the islands

Saint Kitts and Nevis is the smallest sovereign country in the Americas, both in terms of population and area. Approximately 52,441 people live in St. Kitts (41,333) and Nevis (11,108) in 2020. The combined area of the two islands is 260 km². The constitution identifies St. Kitts and Nevis as a sovereign democratic federal state, with the island of Nevis having a high degree of autonomy. The energy sectors on the two islands operate independently, with different institutions and regulatory frameworks.

The island of St. Kitts has no local government, and its administrative structures are those of the Federal Government. The Parliament of St. Kitts and Nevis has the prerogative to pass energy legislation on St. Kitts. The responsible ministry for the energy sector is the Ministry of Public Infrastructure, Posts and Urban Development. The Minister may grant licenses(s), exclusive or nonexclusive, for the generation, transmission, and distribution of electricity for a period of up to 25 years from fossil or renewable energy sources. Under the Public Utilities Commission Act of 2011, a newly created Public Utilities Commission (PUC) would be responsible for regulation and oversight of the electricity sector, including tariff setting, ensuring quality and reliability of service, and long-term planning of the sector. However, the Commission was not created, however as outlined by the legislation the Commission shall authorize the tariffs as filed by a public utility. In 2021, SKELEC is the vertically integrated government owned-corporation; the sole provider of grid-connected electricity on St. Kitts under the Saint Christopher Electricity Supply Act.

Table 1. Main entities related to the electricity sector in St. Kitts

Entity	Type	Tasks and responsibilities
Ministry of Public Infrastructure, Posts, and Urban Development	Government ministry	Responsible for direction of overall national energy policy, strategic direction and future development of the energy sector. Responsible for regulation and oversight of SKELEC. Tasked with consumer protection and ensuring quality of service.
Ministry of Sustainable Development	Government ministry	Responsible for development of policies and strategic direction to achieve long-term sustainable development
Ministry of International Trade, Industry, Commerce and Consumer Affairs	Government ministry	Responsible for the import and regulation of petroleum products.
SKELEC	State-owned, vertically integrated utility	Responsible for the generation, transmission, distribution, and sale of electricity.

Table 2. Legislation applicable to the electricity sector in St. Kitts

Key legislation and latest update	Content	Regulator
St. Christopher Electricity Supply Act (2011), Amendment (2015)	Main regulatory legislation for the provision of the electricity service in St. Kitts. The legislation was amended in 2015 to include provisions on the promotion of renewables such as feed-in-tariffs, net metering, among others.	Ministry of Public Infrastructure, Posts, and Urban Development
Public Utilities Act (2002)	Regulates public utilities, including the setting of the rates and tariffs.	

The island of Nevis has an island authority, the Nevis Island Administration, which is a local government within the Federation. The Nevis Island Assembly has the exclusive right to make laws relating to the generation, transmission, and distribution of electricity on Nevis which is operationalized through the Office of the Premier, which has responsibility for the energy. Similar to St. Kitts, there is no independent regulator for the energy sector. Nevis' utility, NEVLEC, is also a vertically integrated, wholly state-owned incorporated subsidiary and the sole provider of grid-connected electricity on the island. On July 8, 2008, the Nevis Island Assembly passed the 2008 Nevis Geothermal Resources Development Ordinance to give oversight to geothermal exploration and exploitation. NEVLEC is self-regulating and responsible for setting consumer tariffs.

Table 3. Main entities related to the electricity sector in Nevis

Entity	Type	Tasks and responsibilities
Nevis Island Administration (NIA)	The governing body for the island of Nevis	Responsible for certain administration and public matters on the island of Nevis as prescribed under Chapter X of the Constitution of Saint Christopher and Nevis (1983).
The Office of the Premier	Executive of the Nevis Island Administration	Responsible for oversight of energy sector, NEVLEC, cooperation for and development of renewable resources through the Energy Unit.
NEVLEC	Vertically integrated utility, established by statute and owned by the NIA	Responsible for the generation, transmission, distribution, and sale of electricity. Self-regulates and sets electricity tariffs.
Geothermal Advisory Committee	Chaired by the Minister of Natural Resources, with the participation of the Premier of Nevis	Leads the development of geothermal resources on Nevis, including negotiating the terms of geothermal development.

Table 4. Legislation applicable to the electricity sector in Nevis

Key legislation and latest update	Content	Regulator
Electricity Ordinance (2009)	Regulates the provision of electricity in Nevis, including licenses (except for geothermal), metering,	Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment, Nevis Island Administration
Nevis Geothermal Resources Development Ordinance (2008)	Regulates reconnaissance, exploration, drilling, production and use of geothermal resources. Regulates licenses, concessions, PPAs, prices.	

Current status of the electricity grid

St. Kitts and Nevis rely almost entirely on fossil fuel imports to cover its energy demands, as a result of which it releases, on average 0.56 tCO₂ per MWh of electricity it produces. The power supply systems in the Federation are currently operated independently and are not interconnected. SKELEC is headquartered in Basseterre, St. Kitts, and NEVLEC is headquartered in Charlestown, Nevis. Total installed capacity by SKELEC, NEVLEC, and the only independent power producer, WindWatt, stands at a nominal 72 MW, with a peak demand of around 35 MW on the two islands. The operational reserve, provided to ensure adequate power supply in the event of plant failure, including to ensure resilience during cyclone events, is considerably less, as several of the units that are reported by the utilities were commissioned as early as 1987 and have a reduced effective capacity[21]. Outages are required to facilitate maintenance on both islands. It has been the policy of the Government to have developers invest in the power supply, particularly large investments, to offset the financial commitments that would be required to upgrade and expand the grid capacity in order to keep pace with the growth of private capital investment. Thus, some business -especially in the tourism sector- rely on partial self-generation. One example is the Marriott Hotel on Saint Kitts, which has a self-generation capacity of 4MW using diesel generators.[22]

SKELEC provides approximately 74% of the country's electricity and is the sole provider of grid-connected electricity in the island of St. Kitts. It has 52.35 MW of total nominal capacity, of which almost 50 MW (93%) are comprised by diesel generators. Its power station is located at the Needsmust station and electricity is transmitted along twelve 3-phase, 3-wire, 11kV radial feeders, both above and below ground. The 11kV electricity is then stepped down for distribution to 3-phase, 4-wire, 400V and single phase, 2-wire, 230V. The system frequency is 60Hz.[23]

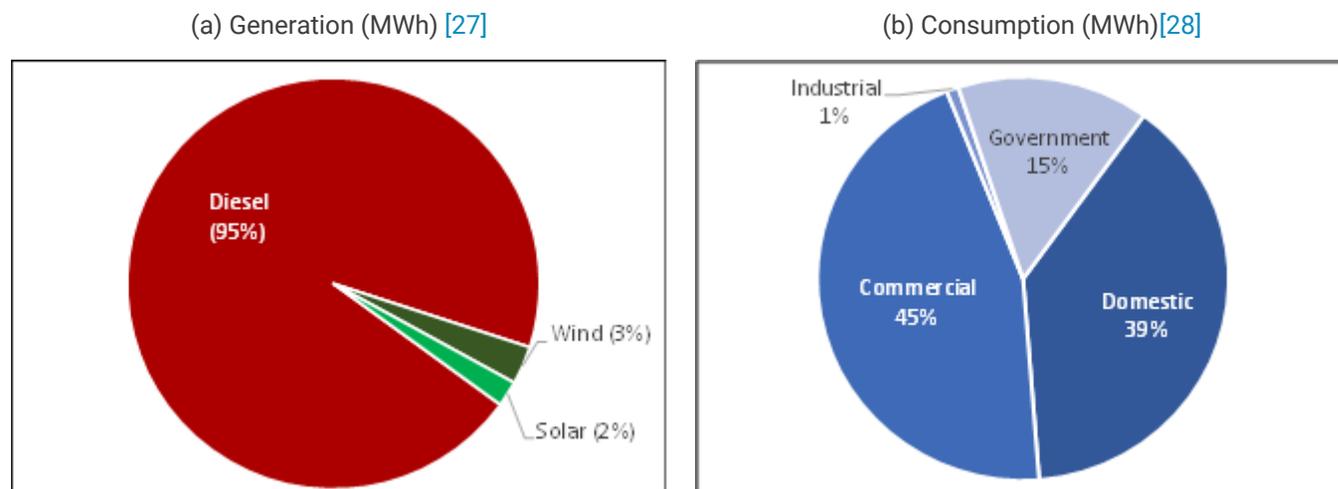
Over the past two decades, SKELEC commissioned a number of new generators to either add new capacity to the system or replace ageing inventory. Between 2011 and 2021, 19.8 MW of diesel capacity has been added into the grid. It purchased two 4 MW diesel generators between 2006 and 2008, replaced a damaged 4MW generator in 2009, and added additional capacity in 2011 when it installed four additional 4 MW diesel generators.[24] It also installed 2.25 MW of solar PV since 2013, of which 1 MW located at the Eastern Caribbean Central Bank (ECCB) is currently operational. It is also estimated that 1.2 MW of distributed rooftop solar PV is available, island wide.

Table 5. Selected grid indicators[25] (2020 data)

Indicator	St. Kitts (SK ELEC)	Nevis (NEV LEC)	Total / Average	%
Nominal installed capacity (MW) [26]	52.35	19.70	72.05	100%
Diesel	48.90	17.50	66.40	94%
Solar	3.45	0.00	3.45	2%
Wind	0.00	2.20	2.20	3%
Peak demand (MW)	26.30	8.40	34.70	
Generation (MWh)	176,196	56,616	232,812	
Transmission and distribution losses (%)	9%	10%	9%	

NEVLEC provides the remaining 26% of the electricity. It owns and operates generators with a capacity of 19.7 MW, with peak demand of around 8.4 MW (1.1-1.2 MW coming from the Four Seasons Hotel alone) and a base load of 5.6 MW; it operates through an 11kV feeder system, with electricity stepped down to 400V and 230V. The average age of the capacity is almost 15 years; with the eldest unit being a 2.5 MW diesel generator set commissioned in 1995, and the most recent (3.8 MW) commissioned in 2017. In 2010, the utility entered into a power purchase agreement with WindWatt Power Inc., the first such agreement in Saint Kitts and Nevis. With a nominal output of 2.2 MW, WindWatt's output to the island's grid is limited to 1.6MW under the existing PPA.

Figure 3. Electricity generation mix and consumption by sector



There are data limitations in the energy sector, which typically requires secondary sources or ad-hoc requests to the utilities' authorities. While no long-term time series with the evolution and projection of consumption for each of the utilities is available, the slow growth in population (0.9% in the 1990 – 2018 period, according to World Bank estimates[29]) paired with the opportunities for reducing consumption imply that a projection of the aggregated electricity consumption will have a soft slope. However, per capita consumption is estimated at 3,540 kWh per capita per year, higher than the average for the Eastern Caribbean region[30], and the developing hotel sector may also drive consumption figures up.

Resilience and water-energy nexus

While the installed capacity reported by the utilities largely exceeds peak demand, power outages are frequent. This is mainly due to a significant part of this capacity belonging to units that are close or beyond their useful lifetime, requiring significant maintenance; this is also the case for at least a fraction of the transmission lines. Thus, operative reserves are currently insufficient to allow for a resilient operation in the event of hurricanes and storms.

As a Small Island Developing State (SIDS), the Federation of St. Kitts and Nevis continues to grapple with the effects of climate change. The nexus between the water and energy sectors is quite explicit in the Federation and becomes even more profound during extreme weather events. Drinking water is assessed via two main sources in the St. Kitts and Nevis: springs which are channeled into surface water systems, and ground water accessed by shallow wells which are located across the country.[31] However, surface water intake has peaked and reached a maximum that fluctuates with total annual precipitation, so an increasing fraction of the water is pumped out of the ground as the number of households grows, driving in turn the consumption of electricity. With the passage of Hurricane Irma and Maria in September 2017, power outages prevented the pumping of groundwater and severely disrupted the water supply.

As a consequence, St. Kitts and Nevis constantly faces the risk of drought. In 2017, water rationing has been in operation as strategic groundwater resources showed signs of saline intrusion due to a lack of rainfall coupled with a rising demand for water. Climate change is set to exacerbate these risks, with projections of drier conditions across the region, and potentially more extreme weather events. The Government of Saint Kitts and Nevis is thus taking steps to secure water provision, particularly to the most vulnerable in the society who are more severely impacted when these natural disasters impact the country. At the time of writing this proposal, the GSKN is preparing a project for a reverse osmosis desalination plant, to be submitted as a GCF project.

Electricity rate

In practice, SKELEC and NEVLEC operate as self-regulating utilities. SKELEC's tariff consists of a base rate, a demand charge, a standing charge, and a fuel surcharge that translates fuel price variations to the consumers. The Federal Government routinely provides subsidies on an ad hoc basis to SKELEC. For residential consumers that use less than 250 kWh per month, the government fully subsidizes the fuel surcharge. About 65 percent of residential consumers benefit from this subsidy.[32] NEVLEC's electricity charge is likewise composed of a base rate, demand charge, a standing charge, and a fuel surcharge, which NEVLEC began billing in 2005. In both cases, it is unclear how an increase in the share of renewables (e.g. through renewable electricity purchases to an IPP with a PPA) would affect the electricity price charged to consumers.

Electricity costs are high and volatile due to the country's dependence on imported petroleum-based fuels. For a reference, the average electricity price in Latin America is 0.16 \$/kWh[33], whereas available data for SKELEC and NEVLEC shows prices between 0.24-0.28 \$/kWh, depending on the type of user[34]. Despite these relatively high rates, maintenance outages are still frequent in both islands. Moreover, and irrespective of price level, price *volatility* derived from variations in oil prices pose an additional threat to the country.

Sources of renewables and their integration into the grid

St. Kitts and Nevis are part of the Volcanic Islands of the Antilles arc, which have significant geothermal potential. It has been identified that both islands have potential geothermal energy sources. The country is participating in the project: *Sustainable Energy Facility for the Eastern Caribbean* (FP020)[35], which aims to finance commercial geothermal energy projects and strengthen legal and regulatory frameworks to underpin the development of such potential in the East

Caribbean region. Harnessing geothermal energy would be a game changer for the islands, as it would lead to a renewable energy source of large magnitude which can serve as base load. However, significant technical and economic challenges and unknowns remain with regards to the extent of the geothermic source and as to the economic and technical viability of drawing on it, and further studies are underway.

Exploratory drilling in regard to geothermal development in Nevis has been completed and the NIA intends to advance the process to facilitate the supply to the NEVLEC grid. It is estimated that the potential size of supply could be anywhere between 10 and 30 MW. A 10 MW plant would exceed the energy needs on the island and would offer the potential to also serve St. Kitts– if an island interconnection as envisaged in the National Energy Policy (NEP) was established. On the island of St. Kitts, in September 2015, the Government of St. Kitts and Nevis signed a letter of intent with the French company Teranov for the exploration of geothermal potential and development of a geothermal plant on this island. Teranov has undertaken geothermal exploration exercises and found that there is potential in St. Kitts to develop at least 18 to 36 megawatts of geothermal power. Thus, at the moment, each island is pursuing their own geothermal plans, each of which would exceed their internal requirements. Lack of coordination between the islands has been a barrier preventing the establishment of a common, coordinated approach towards geothermal.

An EU-funded technical assistance (TA) in 2014 emphasized the relevance of the interconnectivity between the two island grids in order to reduce risk in disaster management and to maximize the benefits in geothermal development. The Department of Sustainable Development from the Organization of American States (OAS) had already performed a first interconnection assessment in 2008, as part of a pre-feasibility study for an electrical connection between St. Kitts and Nevis. This study found that the electrical interconnection between St. Kitts and Nevis is justifiable and would ease the strained energy supply systems of both islands by adding extra capacity. In 2015, Deloitte and Black & Veatch undertook a technical and financial assessment on the potential of the geothermal resource in St. Kitts and Nevis in which they have estimated that the interconnection would trigger annual savings of slightly over USD 10 million per year over a 20-year period from a 10 MW (megawatt) geothermal power plant in Nevis. If a 30 MW geothermal facility would be installed, for which the geothermal potential on Nevis would also suffice, savings of up to USD 85.5 million in Net Present Value (NPV) could be generated for the Federation.[36]

Beyond geothermal, St. Kitts and Nevis also has identified potential other sources including solar, wind and, to a lesser extent, biomass.[37] However, preliminary studies prepared by both SKELEC and NEVLEC suggest that the existing electricity networks would not tolerate a penetration of intermittent electricity (such as wind and PV) higher than 20%.[38] Announced in 2018, the Swiss battery maker Leclanché is expected to utilize a Special Purpose Vehicle (SPV) economic instrument along with a local partner to fund a 35.7 MW solar PV farm with 45.7 MWh battery energy storage system (BESS), which would allow integration with the grid. The project is valued at \$70 million and is expected to be implemented through a build, operate and own (BOO) model. The Government of St. Kitts and Nevis will provide lands within the Basseterre Valley Protected Area under a 20-year agreement with an automatic five-year renewal. For St Kitts, this is a novel "No Capital Outlay" arrangement avoiding a costly up-front investment, whereas the firm is expected to recover its investment over time from the sale of energy under a 20-year power purchase agreement (PPA) with SKELEC. While this initiative shows potential, it was undertaken in an ad-hoc fashion, i.e. without originating in a grid expansion plan. Work following the announcement in 2018 has only just begun.

Energy efficiency

At 2,776 BTU/US\$ unit of output, the overall energy intensity index (EII) in St. Kitts and Nevis is moderate for a developing country. At the utility level, electricity systems losses are high, at 17% (St. Kitts) and 20.3% (Nevis). St. Kitts and Nevis therefore had targeted a 20% reduction in electricity demand by 2015 through energy efficiency measures.[39] The Government has declared its intention of putting a policy and legislative framework in place to support that objective including energy efficiency standards, restrictions on incandescent bulbs, minimum energy performance standards, including through adapting to national circumstances the CARICOM Energy Efficiency Building Code.[40] The St. Kitts and Nevis Bureau of Standards participated in the regional *Eastern Caribbean*

Energy Labelling Project (ECEL) towards improved national energy efficiency by introducing efficiency standards and labels for electrical household appliances and lighting equipment and promoting the use of energy-efficient products.[41] The Government has also set an example by executing level I, II and III energy audits for 35 facilities owned by the government in 2018.[42] As summarized in Table 6, the audits identified potential savings of 2.1 mill. US\$ per year (equivalent to 5,176 tCO₂/yr.), i.e. less than 4 years average payback to recover the 7.8 mill. US\$ that the measures would cost. However, to date the implementation of these actions has not yet found financing and the legislative framework has not been implemented.

Table 6. Summary of the results from the 2018 energy audits in public facilities[43]

Location / type	Facilities covered	Measures identified	Potential electricity savings (kW h/yr.)	Value of identified savings (US\$/yr.)	Cost of proposed measures (US\$)	Emission reductions (kg CO ₂ / yr.)
St. Kitts	21	66	6,622,857	1,706,773	6,264,222	4,577,716
Administrative buildings	8	27	2,591,426	718,163	2,591,481	1,790,787
Water Pumping Stations	13	39	4,031,431	988,610	3,672,741	2,786,929
Nevis	14	48	1,471,334	398,891	1,565,562	598,416
Administrative buildings	8	33	1,123,888	302,091	1,249,562	358,279
Water Pumping Stations	6	15	347,446	96,800	316,000	240,137
Total general	35	114	8,094,191	2,105,664	7,829,784	5,176,132

Note: The category “administrative buildings” in the table covers a wide range of facilities including hospitals, schools, the airport, the courthouse, the post office and public dependencies. The measures proposed in the study are all-encompassing in the sense that they cover both efficiency actions but also identify opportunities for renewable energy generation.[44]

Additional actions being considered to reduce consumption include domestic funding for rooftop solar panel installations. While these measures can help reduce demand, beyond a certain threshold these systems can have a destabilizing effect on the grid, and an impact on the financial sustainability of the utility[45]. An understanding of such thresholds is currently not available for the utilities in St. Kitts and Nevis.

While no comprehensive, country-wide analyses on energy efficiency exist, preliminary estimates showing the potential of energy efficiency measures show that the largest potential comes from air conditioners (used mainly in residential, public and tourism), lighting, and residential refrigerators (Figure 4 and Figure 5 below), estimating potential savings of 9.1% GWh by 2030 even for a minimum ambition scenario. A high ambition scenario could produce over 20% of savings. [46]

Figure 4. Potential for electricity savings over time[47]

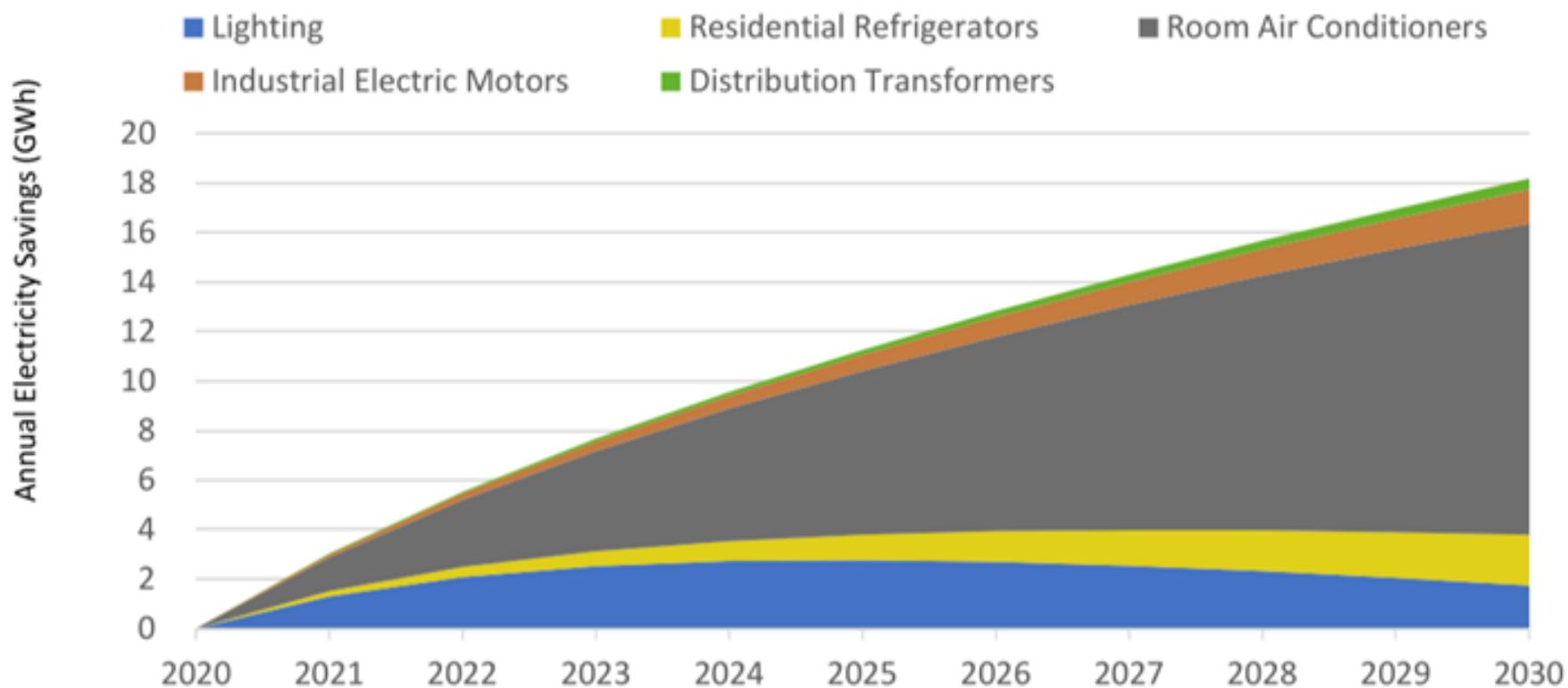
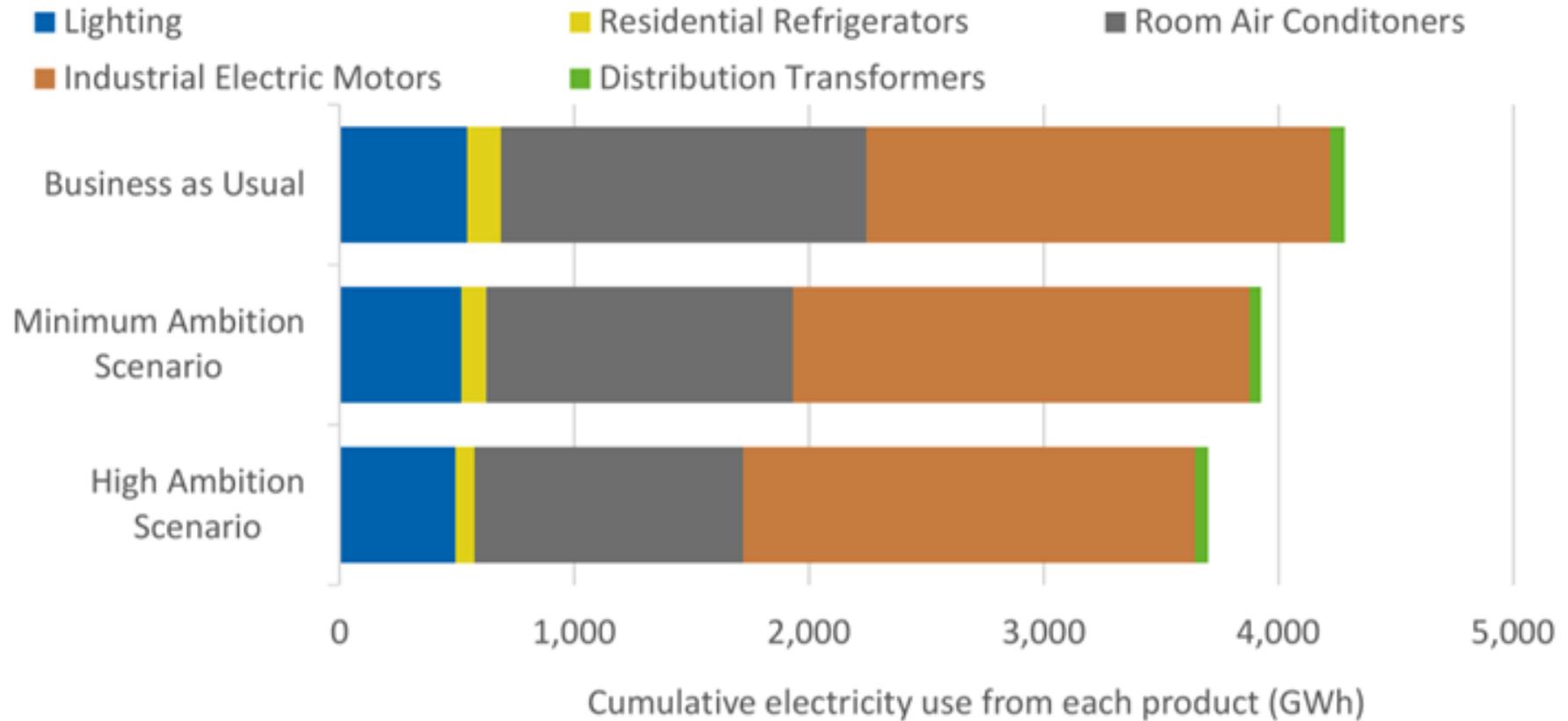


Figure 5. Potential contribution to cumulative electricity use by 2040[48]



St Kitts and Nevis has also been able to access funding through the Caribbean Development Bank (CDB) for its street lighting programme and from other sources for its IT Center, and through regional collaboration from the EU for an Organization of Eastern Caribbean States (OECS) energy efficiency standard and labelling programme. There are however no commercial financing portfolios specifically designed for renewable energy or energy efficiency projects for local investors, which instead must rely on traditional financing options.

Policies and strategies in the energy sector

In 2009, to address any supply challenges and support a transition to clean energy, the government began work on a draft National Energy Policy (NEP) and National Energy Action Plan (NEAP). The NEP was subsequently published by the Ministry of Public Works, Utilities, Energy and Housing of the Federal Government of Saint Kitts and Nevis^[49] in April 2011 and approved later that year. The draft NEAP, which lays out specific steps to implement the NEP, was never adopted and implemented.^[50]

With the support of the European Union (EU) utilizing the technical assistance budget line under the General Budget Support Annual Action Plan (AAP) 2013, GSKN received technical assistance to revise and adopt its National Energy Policy to facilitate the incorporation of alternative energy and include measures for feed-in-tariffs and net metering. These revisions were introduced in 2014 and remain to this day. The 2014 revision changed the vision in the NEP from

“(becoming) a twin-island nation with a sustainable energy sector where reliable, renewable, clean and affordable energy services are provided to all its citizens”[51] to “(becoming) an island nation with a sustainable energy sector where reliable, renewable, clean and affordable energy services are provided to all its citizens, where energy efficiency and the replacement of fossil energy by renewable energy sources will be promoted in all sectors of the economy, and where by 2020, 100% of the electricity supplied in the country will be produced from renewable energy sources”[52].

With regard to the electricity sector, the NEP calls for: (i) improvement of efficiency in generation, transmission and distribution; (ii) stimulation of environmentally, economically, financially, and socially appropriate and viable renewable energy sources for electricity generation; (iii) fair access to transmission and distribution infrastructure for both utility and small-scale generation, allowing for strong and competitive participation of the private sector; and (iv) collection, monitoring, and reporting of greenhouse gas emissions by the electricity sector. The policy also specifies a number of policies for the transportation sector, such as increased use of fuel-efficient motor vehicles and regular emissions inspections, and general energy use, such as improved efficiency and conservation practices, new building codes, and mandatory installation of solar thermal collectors for major water users.

The lack of a feasible, technically realistic pathway underneath the NEP and the NEAP ultimately played against the ambition of achieving a 100% renewable-based grid in the period between 2014 - 2020. The policy and the draft implementation plan failed to lay out a clear path for the implementation of its recommendations; nor did it describe which institutions will be responsible for implementing which specific actions, provide measurable goals and targets, or set priorities and timelines. Its language often remained vague and non-prescriptive[53].

Despite the slow pace of implementation, the NEP captures the country’s determination to undertake a transition towards a cleaner grid, and many of its recommendations are still relevant and needed as of today, e.g. improving the capacities of the National Statistics Department to collect, compile, and make available to the public relevant energy data, and the recommendations to scale-up energy efficiency efforts.

Policies and strategies in terms of sustainability and climate change

Under the St. Kitts and Nevis National Climate Change Policy, November 2017, and its Nationally Determined Contribution (NDC of 12th December 2015), mitigation inclusive of energy efficiency, renewable energy (energy sector) and bio-energy (transportation sector), will be the means for reducing GHG emissions. St Kitts and Nevis has committed to a 22% reduction of the absolute GHG from the Business as Usual (BAU) scenario in 2025, and a 35% reduction of the absolute GHG from the BAU scenario in 2030.[54]

St. Kitts and Nevis is a signatory to the UNFCCC, the Kyoto Protocol and the Paris Agreement and subscribes to the SDGs. St Kitts & Nevis also ascribes to the CARICOM Regional Framework for Achieving Development Resilience to Climate Change and its Implementation Plan, the CARICOM Energy Policy, and the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS). These regional and international commitments are part of the framework for achieving a low-carbon energy sector, specifically utilizing renewable energy technologies, coupled with energy efficiency gains,

Public procurement

A Procurement Reform in St. Kitts and Nevis is being spearheaded by the Ministry of Finance in partnership with the Caribbean Development Bank (CDB) under the Public Procurement Reform in the Eastern Caribbean Project. This initiative commenced in January 2020 with the provision of Technical Assistance to revise towards modernization of the Procurement and Contracts Administration Act (2012) to address gaps identified during the execution of a

Methodology for Assessing Procurement Systems (MAPS) completed in 2019. The legislation will also serve to more clearly articulate its applications which will include all public corporations which encompasses both the St. Kitts Electricity Company Ltd (SKELEC) and the Nevis Electricity Corporation Ltd (NEVLEC). The legislation is also expected to include matters pertaining to sustainable procurement, through the development of a Sustainable Procurement Policy.

The drafting process is ongoing and after months of discussion on the first draft which -has been challenged by the impact of the pandemic- the second round of review of the revised legislation will commence shortly. This reform process is a critical component in the national agenda of the Government of St. Kitts and Nevis in its efforts to ensure sustainable growth and development while ensuring value for money, poverty reduction, addressing inequality, climate change and environmental degradation.

Baseline projects and activities

The following table provides a summary of on-going projects and activities that are relevant for this project:

Table 7. On-going initiatives in St. Kitts and Nevis

Project	Implementing Institution	Timeline	Budget allocated to St. Kitts & Nevis	Objectives and relevance to this project
NDC enhancement and implementation (national)	IRENA, UNDP, NDC Partnership	2021	Not publicly available	Activities include: the development of an energy management methodology for greenhouse gas emissions (GHGs); target tracking; roadmaps for the electrification of the transport sector; roadmaps for emerging technologies, such as green hydrogen and ocean energy; rooftop solar simulation; energy monitoring, reporting and verification (MRV); mitigation scenarios; project facilitation; and access to finance.
GEF Technology Needs Assessment (TNA) (national)	UNEP DTU Partnership	2020 – 2023	USD 270,000	Update its 2006 TNA as well as to create a Technology Action Plan
Improving Environmental Management through Sustainable Land Management in St. Kitts and Nevis (GEF-6) (national)	UNEP, IUCN	2018 - 2023	USD 3,015,982	To transform degraded forest landscapes into biodiversity and climate-friendly areas of sustainable agricultural / agroforestry production. This project foresees the updating of the St. Kitts National Physical Development Plan (NPDP), as the Nevis Physical Development Plan was recently updated, and the National Building Code
Energy and Energy	European Development	2018 - 2022	EUR 5,200,000	To support St. Kitts and Nevis to establish

Efficiency Sector Budget Support (national)	ment Fund			a sustainable energy sector based on local renewable energy sources by increasing integration of the renewable energy and energy efficiency in public facilities.
Sustainable Energy for the Eastern Caribbean Programme (SEEC) and the Sustainable Energy Facility for the Eastern Caribbean (SEF) (regional)	Caribbean Development Bank (CDB) as executing entity and IDB as implementing agency. With funding from the GEF, GCF, JICA, and IDB	2017 - 2025	USD 190,468,000 (23,900,000 correspond to St. Kitts and Nevis)	Seeks to address the financial, technical, and institutional barriers faced by geothermal energy and to provide institutional strengthening. This project has financed a series of energy audits in public buildings that are the basis for the design of the pilots in Component 2 of the present PIF.
Building Resiliency in the Water Supply Sector in St. Kitts and Nevis (national)	GCF	2022 - 2027	USD 38,300,000	The project seeks to increase climate resilience and sustainability for the water supply sector in SKN. It is expected to develop a 7 MW renewable power plant to provide electricity to a water desalinization plant, selling surplus to the electric grid. It is important to note that that scope of the project is under further review and discussion based on feedback received from the GCF in 2020.
GEEREF NeXt (GCF FP038) (global)	European Investment Bank (EIB)	2017 - 2023	USD 265,000,000 (total GCF grant + equity for 35 countries in Eastern Europe, Latin America and the Caribbean)	GEEREF NeXt is designed to catalyze private sector capital at scale for the development of RE/EE projects across the GCF eligible countries, as well as to build capacity at the local level and contribute to the necessary transfer of knowledge and technology, to support the evolution of the commercial environments and enabling ecosystems for clean energy in these countries.
CDB storage (regional)	CDB	2018 – on-going	USD 350,000 (regional)	Grant to assist utilities and relevant stakeholders across the region to develop, plan and design energy storage and grid modernization solutions, which could accelerate the Caribbean's shift to clean energy.
CDB Street and Flood Light (national)	GSKN with funds from the CDB	2018 - 2021	USD 5,792,000	GSKN requested financing from CDB to replace all of its High-Pressure Sodium (HPS) and Mercury Vapour (MV) street lights with high efficiency LED systems as well as flood lights on identified playfields.
35.7 MW solar photovoltaic system (solar field) and a 14.8	Leclanché S.A.	2018 – on-going	USD 70,000,000	First of its kind in St. Kitts and Nevis. Commissioning announced for 2022

MW / 45.7 MWh lithium-ion battery energy storage system (BESS) (national)				
Solar Carport Project For The Eastern Caribbean Central Bank In Basseterre, St. Kitts (Two phases of solar carports totaling 1.1 MW) (national)	Eastern Caribbean Central Bank (ECCB)	2018 - 2021	Not publicly available	This project will offset about half of the energy usage on the bank's headquarter in St. Kitts. The project is designed considering hurricane survivability (up to 180 mph winds) and corrosion protection. It is also expected to introduce energy efficiency measures for the entire compound, as the ECCB expects to achieve full carbon neutrality by 2022.
Public Procurement Reform in the Eastern Caribbean Project (regional).	Caribbean Development Bank (CDB)	2018 – on-going	USD700,000	This project aims at assisting with the establishment of modern procurement systems in the Organization of Eastern Caribbean States (OECS). Procurement processes that arise from this project will be applicable during the energy transition to renewables that will take place as a result of the proposal described on this PIF.

Access to finance

The climate finance landscape remains complex and fragmented, placing a considerable burden on SIDS as it relates to their ability to navigate climate financing options and arrangements and to make effective use of available funds. Particular obstacles also include high transaction costs for accessing resources and changing criteria for eligibility, access, implementation, monitoring, and reporting. International Financial Institutions (IFIs) also tend to prefer larger projects over smaller or medium sized, which places SIDS in a disadvantaged position.^[55]

At present, basic operating costs are covered by tariffs, but there are not sufficient funds for adequate maintenance and replacement of systems. While financial performance has reportedly improved in recent years, SKELEC and NEVLEC are still without a fully integrated asset management framework that ensures regular maintenance and sets aside funds for asset replacement. This is clearly demonstrated in the difficulty in funding urgently needed new diesel generators, and the rundown nature of the networks.

The type of ambitious energy transition that St. Kitts and Nevis intends to undertake will require a considerable amount of funds. The Republic of the Marshall Islands -a similarly sized, twin island state with a similar ambition and baseline- estimated that it would need \$130 million to achieve a 50% reduction of GHG emissions from its electric grid, with an additional \$5 million per year in net increased costs to provide an improved service.^[56] The risk in moving to a capital-intensive system -like a renewable-based power grid- is that they need investments after their amortization, without which the system may fail or need to revert back to diesel generation.

In an effort to operationalize the NEP, the Government has embarked on several negotiations with private developers, donors and government partners, yet to date only a small share of the electricity is produced from solar and wind capacity. Geothermal possibilities are being investigated closely by both islands, but these initiatives still need further de-risking.[57] Technical assistance provided by the Caribbean Development Bank (CDB) recommended the recruitment of a Geothermal Legal Expert and the undertaking of an Environmental and Social Impact Assessment (ESIA). Both consultancies remain in the early stages of dialogue to secure financing and illustrate the challenges in preparing a solid portfolio of bankable proposals.

While St. Kitts and Nevis is a party to a facility under development utilizing funding through the GCF (referenced to as “[GEEREF NeXt FP038](#)”), to date no projects have been financed in the country through these specific funds. Nonetheless, main investments in the energy sector are those financed by loan and/or grant funds, as shown in Table 7 above, with the only exception being the projected Leclanché solar PV. While this project shows significant potential and can work as a lighthouse for the development of the future, its path has not been without difficulties. While it was initially anticipated that the project would be completed by September 2020, the developer has only been able to break ground in December 2020, with additional 18 months for construction and commissioning.

As for the financing of energy efficiency measures, while these offer significant savings (refer e.g. to Table 6 above), investors perceive high up-front costs and the lack of a special commercial facility as a dis-incentive. Finance is generic and energy efficiency is not entitled to softer conditions, and only large institutions consider such endeavors[58].

iii) Proposed alternative scenario with a brief description of expected outcomes and components of the project;

Overview

The objective of this project is to accelerate national decarbonization through a transition towards a 100% renewable electricity generation and 100% high energy efficiency public buildings in St. Kitts and Nevis. As highlighted in the baseline section, the country is advancing with a series of initiatives and investments with the aim of moving towards these targets. However, as noted in section 1, the country faces a series of barriers to achieve these. A key challenge is to build a comprehensive enabling environment, that can support St. Kitts and Nevis to manage and achieve a transition to decarbonization in a controlled and economically, socially and environmentally viable manner. The GEF incremental logic is that through GEF financing St. Kitts and Nevis will be able to build upon existing investment to address such barriers to decarbonization and achieve its ambitious climate targets.

Through this GEF project, a comprehensive enabling environment for a clean energy sector will be developed, supporting the country to develop a clear and controlled roadmap for achieving its targets. The project will also support the country to develop the necessary policies, regulations and incentives to implement its roadmap. The roadmap connects targets with actions and incorporates and builds upon a series of recommendations provided by previous studies conducted in the country. The aim is that this project will make a significant contribution in terms of providing a shared vision and a coordinated approach that will enable investments from different development partners and projects to be clearly directed towards a common, clearly defined target.

This project is organized into three components:

- Component 1 supports St. Kitts and Nevis in the development of a comprehensive enabling environment for achieving decarbonization of its electricity grid. It sets the ground by providing a revised National Energy Policy that updates the goals currently set for 2020. While the revised goal will reflect the country's heightened ambition, it will also be anchored in technical, financial, and institutional feasibility. The NEP will be prepared in parallel with a roadmap that starts from the current situation and determines a pathway for achieving 100% renewable energy electricity generation. Other key institutional arrangements that are needed for the implementation of the roadmap are also included as part of component 1; this includes an inter-island coordination commission, the drafting of required energy efficiency policies, the establishment of a knowledge management system and gender-sensitive training on planning and regulatory aspects for government and utility officials.
- Component 2 provides the first steps towards the implementation of the roadmap, by demonstrating to local stakeholders the technical, economic, social and environmental feasibility of achieving its ambitious targets. Pilots will demonstrate resilient high energy efficiency buildings and innovative grid-integrated renewable electricity generation, building on the outcomes identified by the 2018 energy audits financed by the Sustainable Energy Facility (SEF) for the Eastern Caribbean.
- Finally, Component 3 supports St. Kitts and Nevis with obtaining investment for implementing its roadmap and investment plan (output 1.2) in order to achieve the goals of its national energy policy (output 1.1). It aims to ensure that the regional and international financing community are fully aware of these opportunities contained in the roadmap and investment plan, including the developed pipeline of projects (output 1.2).

Desired transformation and theory of change

The following table maps the barriers presented earlier in this document with the outputs that are part of the project (described in further length in the subsections below). It highlights the desired transformation that is expected to stem from the project intervention. This is the basis for the theory of change that is depicted in Figure 6.

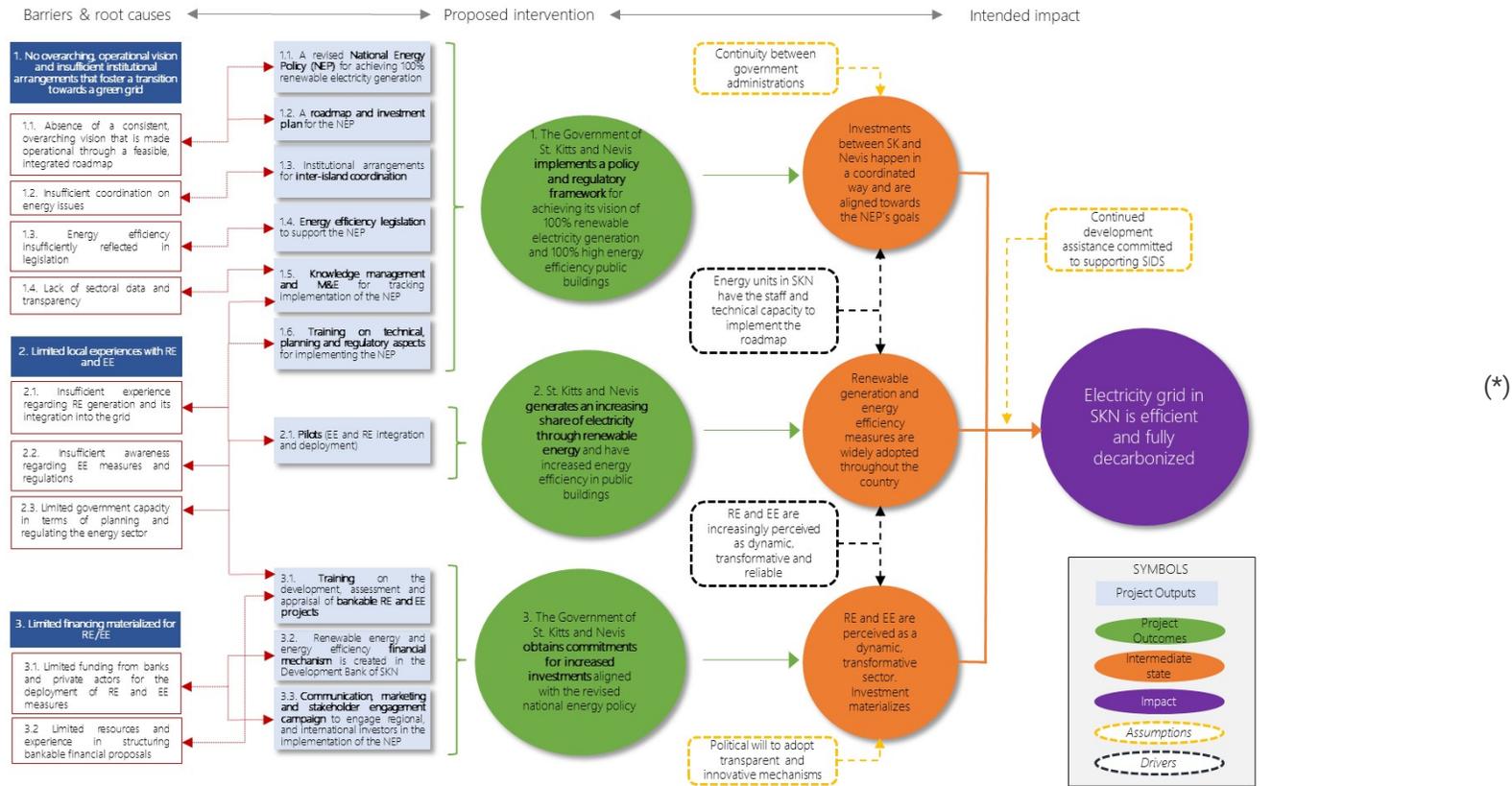
Table 8. Desired transformation as a result of this project's implementation

The current context	Desired transformation of behavior to be achieved through the project
No overarching, operational vision and insufficient institutional arrangements that foster a transition towards a 100% green grid (barrier 1).	<p>The Government of St. Kitts and Nevis makes decisions on energy based on an ambitious, technically feasible National Energy Policy which guides their efforts in the sector for the short, medium and long term. The Government executes a roadmap for implementing the NEP, including identified phases, technologies, roles, responsibilities, timelines which together close the identified gaps. This transformation will be possible through the different outputs in component 1 of this proposal. Investments between St. Kitts and Nevis happen in a coordinated way and are aligned towards the NEP's goals.</p>
Lack of local evidence of and experience with the economic and social viability of low-emission energy solutions (barrier 2)	<p>All dimensions of the energy transition are visible and understood by the stakeholders, more importantly, the Energy Units (in the Federal Government and the Nevis Island Administration) and the utilities, SKELEC and NEVLEC. The potential -but also the challenges- in the transition towards a 100% renewable grid are identified, quantified, feeding back into the roadmap. Renewable generation and energy efficiency measures start to be widely adopted throughout the country.</p> <p>This transformation will be achieved mainly by Component 2 (i.e. the pilots in output 2.1), as well as through capacity building activities (outputs 1.6, 3.1) and the knowledge management mechanism (1.5).</p>
Limited financing materialized for renewable energy and energy efficiency (barrier 3)	<p>The needs and opportunities arising from the transition are understood by the entities that can provide the required funding. The roadmap is supported by a sound, fully bankable portfolio of renewable projects with a thorough risk analysis that are prioritized by the Government of St. Kitts and Nevis. The timing of each investment is known in advance and represents the most effective pathway for the development of the country. Project risks in the electricity sector are minimized to the largest extent possible, facilitating the involvement of targeted partners. Fiscal risk analysis undertaken based on financing options. Renewable energies and energy efficiency improvements are perceived as a part of a dynamic, transformative energy sector.</p> <p>Component 3 will capitalize on the certainty and de-risking brought up by Component 1, further improving the conditions under which renewable energy and energy efficiency projects have access to funds, creating local capacities to prepare robust project proposals, and engaging with banks and multilateral institutions to orient their resources to the different milestones in the NEP's roadmap and investment plan.</p>

The theory of change behind this project can be summarized in Figure 6. The left side of the diagram starts with the barriers and the root causes, the latter of which inform the outputs included in this project. The *outcomes* resulting from these outputs depict a scenario where these barriers have been addressed and alleviated, with institutional arrangements, policies, capacities, and resources in place to gradually increase the share of renewables in the grid. Political continuity in terms of the commitment assumed through the NEP and the retention of technical capacity created through the project, together with interest in adopting transparent and innovative financing mechanisms will allow for a deeper penetration of renewables. Due to the inherent challenges faced by SIDS

(e.g. lack of economies of scale, large distances from production and consumption centers, high exposure to extreme events, etc.), it is nonetheless important that development assistance continues to support the country, which in turn will be able to channel these resources faster, more transparently, and more efficiently, achieving a smooth transition towards a fully decarbonized grid.

Figure 6. Project theory of change (*)



Note: output names have been summarized to fit the page. *Drivers* are external conditions necessary for project results to lead to next-level results, over which the project has a certain level of control; *assumptions* refer to external conditions necessary for project results to lead to next-level results, over which the project has no control e.g. turn-over of government officials, global financial situation, technological advances, etc.

The next sub-sections present each of the components in the project, together with their respective outcomes and outputs, and with a focus on describing the general aim and rationale behind each of the proposed interventions. Preliminary suggestions for deliverables are included for each of the outputs; however, these will be further refined under the actual design phase of this project. Likewise, specifics regarding the actual administrative and technical arrangements for the implementation at the output level will be established during the PPG phase. A general overview of the overall implementation arrangements is nonetheless presented on section 6 below.

Component 1: Policy and institutional arrangements for decarbonizing the electricity sector and enhancing energy efficiency of public buildings

Outcome 1: The Government of St. Kitts and Nevis implements a policy and regulatory framework for achieving its vision of 100% renewable electricity generation and 100% high energy efficiency public buildings.

Component 1 is organized into six outputs that set the ground for the transition towards renewables. Key co-financing for this component is the strengthening of the Energy Units to be undertaken with the support of development partners including the EU, CDB, GCF and Government of St. Kitts and Nevis resources, as this will allow for the Government to enhance institutional capacity in terms of identifying the conditions necessary to provide an enabling environment for the Sector. The Energy Units in St. Kitts and in Nevis will also provide advice and assist the Federal Government and the Nevis Island Administration in reviewing the National Energy Policy which sets the framework for the energy sector.

The outputs in component 1 are as follows:

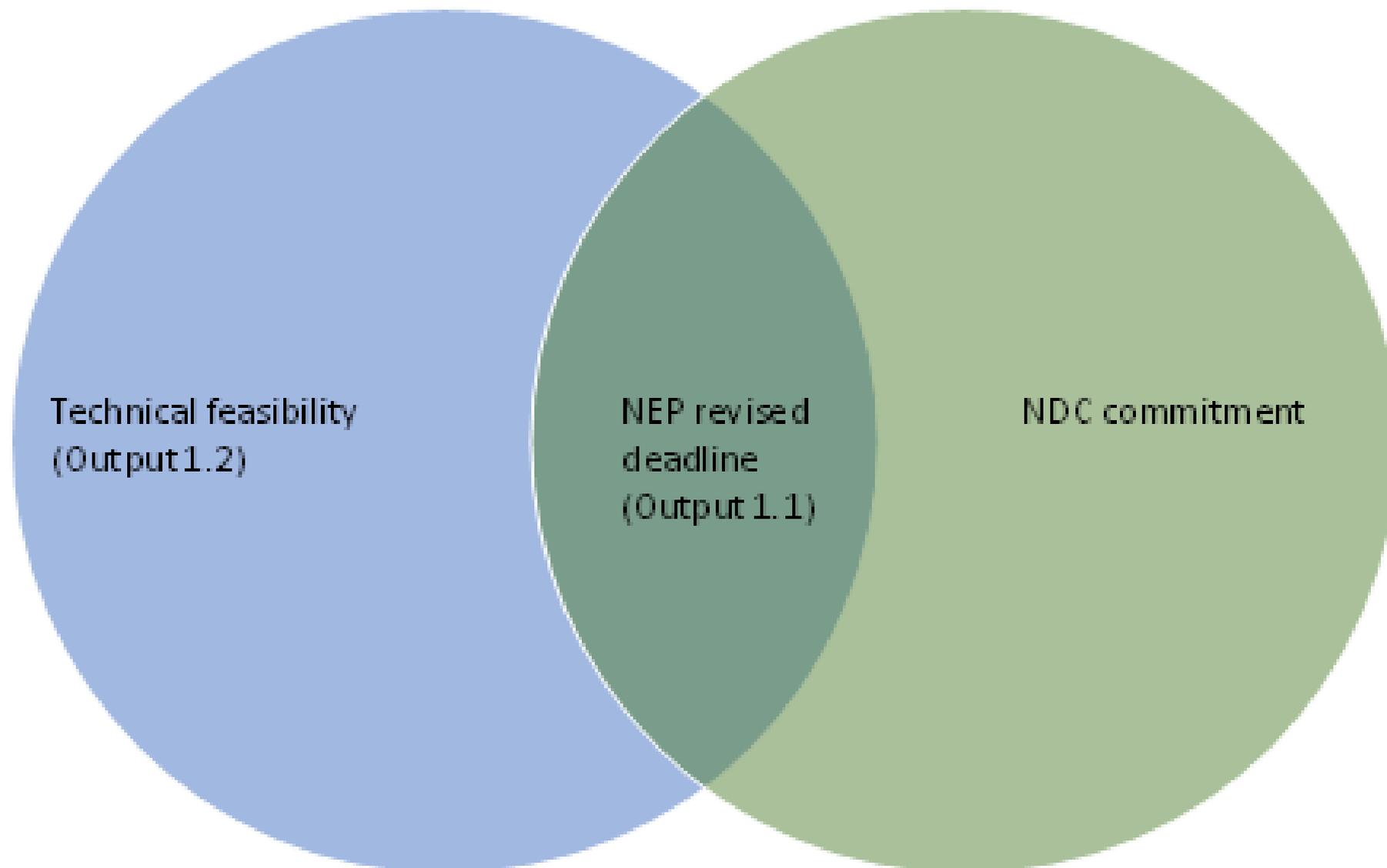
Output 1.1. The Government of St. Kitts and Nevis develops a revised National Energy Policy for achieving 100% renewable electricity generation and 100% public buildings with high renewable or energy efficiency.

St. Kitts and Nevis' National Energy Policy set a target of 100% renewable electricity generation by the year 2020. While this target has been in place since 2014, the funding and projects to achieve this were not defined. As a result, in 2021, the level of generation from renewables is only around 5%.

This output will update the NEP to achieve the 100% renewable electric generation goal within a revised, feasible timeline, and also a goal of 100% public buildings with high renewable or energy efficiency. Moreover, the NEP must result in a resilient electricity grid. This means that the users from the system must be able to resist or rapidly recover from natural hazards such as hurricanes, floods and heatwaves.

The process to develop the NEP will reconsider the feasibility of the alternative pathways that are actually available to the country. The roadmap and the technical analysis will also inform future revisions of the NDCs.

Figure 7. Updating the NEP



Output 1.1 and output 1.2 (the roadmap for the Policy) will be developed in parallel, as they are mutually dependent and require as an iterative process. The timeframe for achieving the NEP target will be assessed in light of quantitative analysis of output 1.2. Once this iteration converges, output 1.1. will provide the vision and timeframe and output 1.2. the specifics for its implementation. By providing concrete, prescriptive guidelines the NEP will clearly convey the country's position on a series of high-level matters that will shape the form and set the course for the electricity sector.[59] Examples of such elements can include, *inter alia*:

- o Grid model, i.e. the decision to have a centrally-planned and controlled grid versus a de-centralized system, or a mix of both depending on circumstances;

- o Affordability of tariff and utility business model (e.g. full recovery or costs + amortization of capital expenditures vs cost recovery only). Affordability must consider equity issues and different users' ability to pay.
- o Targets and guidelines on energy efficiency, aligned with the long-term target of 100% high energy-efficient public buildings: reducing losses in the supply of electricity, and reducing use through renewable energy technology, energy efficiency technology and behavior change, will reduce the amount of investment required for generation equipment, saving money overall. By reducing waste and being smarter with the use of energy, customers will also save money. The NEP will include a chapter on energy efficiency, thus reducing the need for a separate policy.
- o Energy security and resilience: The switch to using local geothermal, solar and wind resources will provide a higher level of energy security and resilience to global changes in oil price. At the same time, equipment should be resilient to the growing risks from climate change – and general guidelines can be set in this direction.
- o Reliability targets. A reliable high-renewables grid requires attention to the entire system, including network upgrades, maintenance, and retaining essential diesel generation capability to serve as backup.
- o Decision on the electrification of key sectors, e.g. regarding the electrification of the transport sector

Suggested deliverables for this output will therefore include:

- 1.1.1. Assessment of at least three alternative time horizons for the decarbonization of the electric grids of St. Kitts and Nevis, including a breakdown of investments, a levelized cost of electricity and an incremental cost analysis.
- 1.1.2. Gender Strategy for mainstreaming gender aspects (including indicators and targets) in the revised national energy policy (NEP) and its Roadmap.
- 1.1.3. Report: rationale for the technical choices in the national energy policy.
- 1.1.4. Draft revised National Energy Policy (NEP), including revised timeframe for the transition to a 100% renewable electricity grid and 100% high efficiency public buildings, presented to the Government of St. Kitts and Nevis for adoption.
- 1.1.5. Public gender-sensitive consultation and engagement workshop on the draft revised national energy policy (NEP).

Output 1.2. The Government of St. Kitts and Nevis develops a roadmap and investment plan for implementing the National Energy Policy.

The roadmap consists of a clear plan for achieving the national policy, with partial targets, goals, budgets, and responsible entities. It will provide the Federation of St. Kitts and Nevis with costed, technically sound pathways for the electricity sector to meet its targets, facilitating access to public and private financing and reducing uncertainty and risks.

The proposed roadmap is conceived as an intrinsically holistic tool, as it is not limited to a technological dimension. It will also include guidelines for required regulations, institutional development, and the human and financial resources to ensure a successful rollout of the technology with the related financial risk analysis. While its recommendations are still high-level, this plan is much more concrete than the NEP in the sense that it recommends specific pathways. Recommendations typically address the challenges of transitioning from a power system based on fossil fuels, in which costs are driven by fuel consumption, to a system dominated by renewables and in which costs are driven by upfront investments but with lower marginal costs.

The proposed roadmap will break down the timeline towards meeting the goal set by the NEP, and include the following minimum content:

- o Technological pathways for generation from renewable sources, including a prioritization of projects and details about their maturity (pre-feasibility, feasibility, design). At least two pathways will be considered: one with interconnection between St. Kitts and Nevis, and the other where the two islands remain autonomous.
- o Detailed phases, milestones and intermediate targets to comply with the NEP's goals in the timeframe established in the policy. This will include identified thresholds that are due before the 100% renewable transition target is complete. Examples that are to be considered include a target for 100% of the public buildings adopting energy efficiency measures, milestones for the deployment of e-mobility and a target for a 'diesel-off' day, i.e. the instant were all the electricity being provided to the country is entirely sourced from renewables.
- o Alternatives for the integration of renewables into the grid, including infrastructure investments (e.g. storage, smart transmission, grid reinforcements, distribution automation) and operational measures (e.g. demand-response programmes, adapted generation dispatch and control, network monitoring, improved resource forecasting), to allow for generation intermittency from variable renewables.
- o Assessment of the impact of a transition to electric mobility (including additional load on the grid and investments required in terms of charging infrastructure).
- o A resilience building strategy and action plan, including vulnerability assessments for establishing a "least regret" path
- o Pathway towards achieving energy efficiency goals in the NEP, including milestones and intermediate targets
- o Fiscal risk analysis of financing options based on source/sources of financing.
- o Human resource strategies,
- o Institutional gaps and needs,
- o Financing and implementation arrangements, including pipeline of bankable projects, classified along the spectrum of required finance (i.e. from grants and concessional loans to commercial loans)
- o A medium-term (i.e. 10 years) detailed workplan including studies, investments (generation, transmission/distribution), regulatory and capacity building actions.
- o Detailed MRV system for tracking the implementation of the policy transition towards renewables, stating data that is available and data that needs to be compiled.

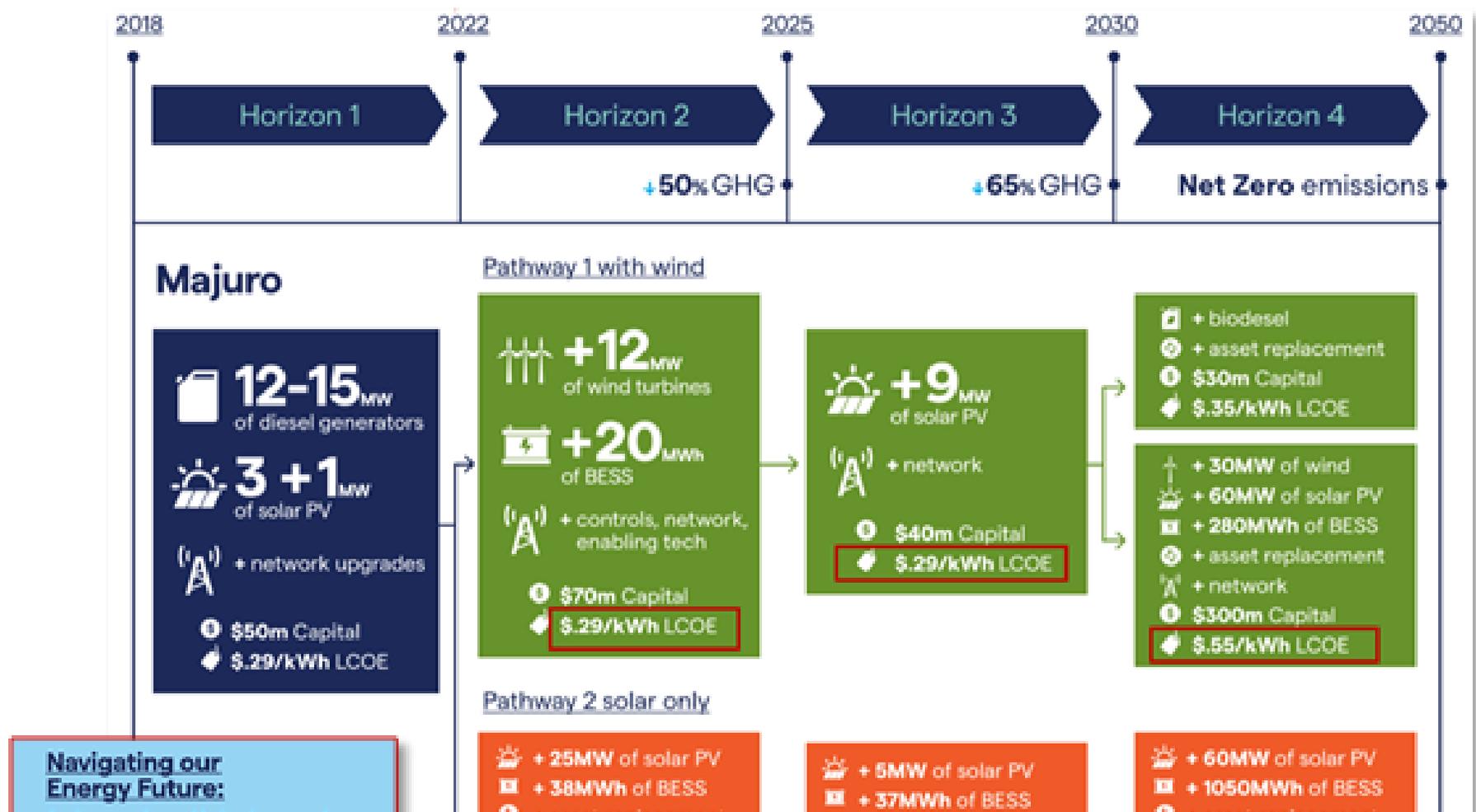
The roadmap process starts from the scope and timeline given by the NEP (output 1.1). The project team will then undertake a technoeconomic analysis to determine a set of least-cost energy pathways, identifying costs and benefits identified for each of them. Once finalized, the roadmap analysis is presented at a final workshop for the Government and key stakeholders. Any findings from this workshop are then incorporated into a final report covering the full details of the roadmap, which is delivered to the Government for official endorsement. The roadmap report is delivered along with any software models developed in the roadmap process and with presentations and infographics useful for communicating the findings.

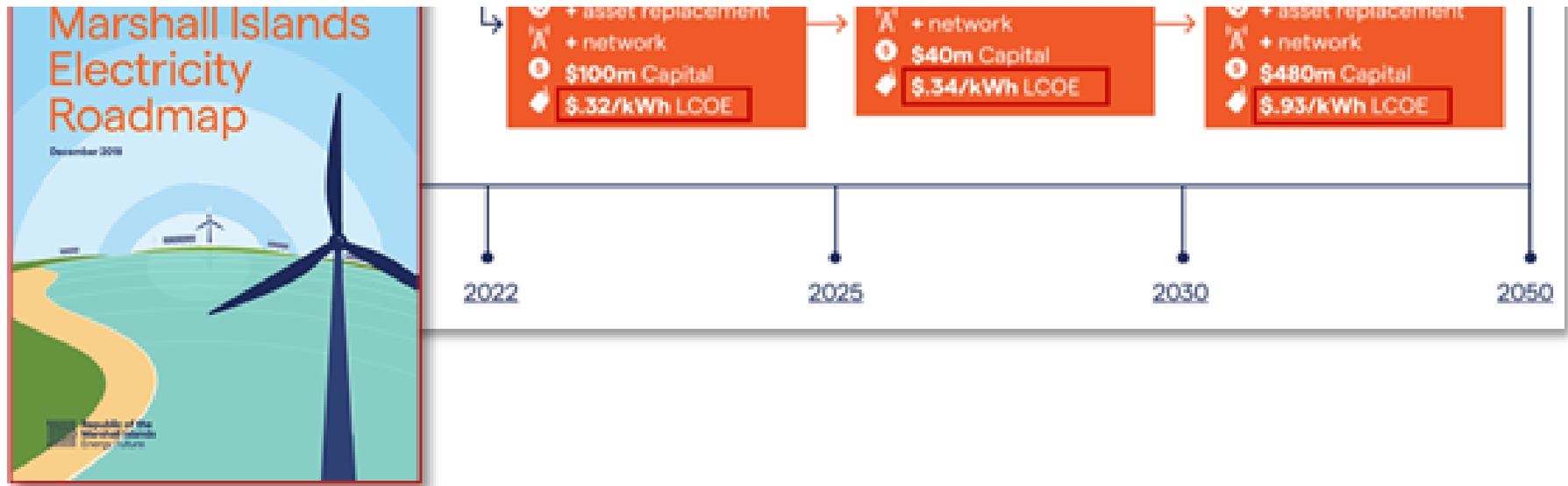
The core of the roadmap is a techno-economic analysis that aims to determine a least-cost, technically sound energy mix that meets priorities and timeframe established in the NEP. The assessment will consist of the interaction of a capacity expansion model that examines both investments in generation technologies and operational costs such as fuel and maintenance, as well as a dispatching model to determine any potential operational constraints that could result from the integration of the different levels of variable renewable energies.^[60] These operational constraints may justify grid integration studies, which can be identified and prioritized within the roadmap itself. This output will identify technical regulations that will be required to ensure that there is

sufficient firm capacity for generation adequacy, sizing of operating reserves to address flexibility needs, ensuring system stability (frequency, voltage, rotor angle), compliance with physical limitations of the network, protection systems, etc. The project will identify such needs in alignment with the chosen transition pathway and incorporate them into the roadmap.

On the adaptation aspects, generation diversification, distributed energy solutions and technical advancement to increase the resilience of physical assets have been the most commonly discussed measures to increase the adaptation capacity of the energy sector. Renewable energies reduce vulnerability to climate risks by diversifying power generation resources and introducing innovative solutions such as battery storage. Off-grid renewables can play a key role in disaster hit regions and increase resilience of infrastructure and communications. Moreover, in the specific context of this project, water is the key nexus between renewable capacity and adaptation measures. The technical assessment to be prepared to inform the roadmap will therefore explore the potential for renewable-based desalination, decentralized water supply solutions and solar- and wind-powered systems for water purification, along with the impact of the alternative pathways on adaptation and resilience.

Figure 8. Example of a roadmap with costed, alternative pathways and intermediate horizons in a SIDS[61]

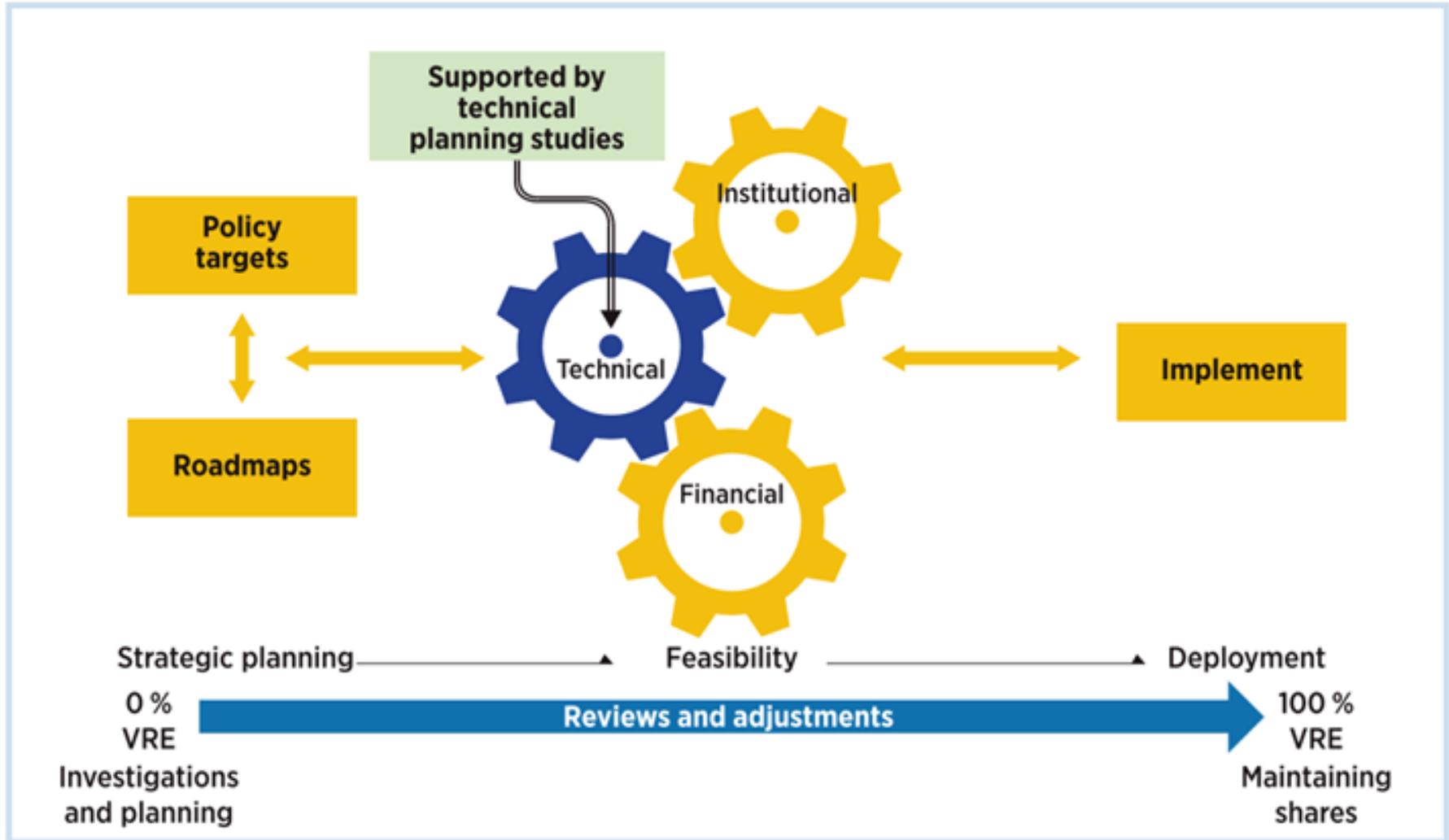




Potential partners with experience in conducting this type of analysis in the region have been identified. These include Caribbean Centre for Renewable Energy & Energy Efficiency (CCREEE), which has a [specific programme](#) to support countries in the preparation of Integrated Resource and Resilience Plans, with experience in Jamaica, Belize, Guyana, and Trinidad and Tobago. Another partner may be IRENA, through its [SIDS Lighthouse Initiative](#), which also has extensive experience providing similar studies in the Caribbean region. Potential cooperation frameworks will be explored in the PPG phase.

The Leclanché solar PV was identified as a potential co-financer for this project. With commissioning expected in the second semester of 2022, it will become the first utility-scale variable renewable energy power plant in the country, and as such the first private sector experience towards a decentralized, zero-carbon energy grid. As a ground-breaking experience, many regulations for the integration of this project into the operation of SKELEC will need to be developed. Given the wide range of technical challenges that can arise with variable renewable energies integration (e.g. in terms of load flow, stability, etc), implementing the solar PV power plant will contribute to establishing a formal planning process to identify, understand and quantify the issues that are most relevant for the power system and the planned renewable deployment strategy. The GEF project will build upon this to include the long and mid-term expansion plan (aimed at defining the technical requirements to be imposed by the grid code for the connection of load and generating units) and the short-term operational planning required to determine the optimal generation schedule for the upcoming operation periods. In small-island power systems, operational planning is usually carried out only when significant changes to the system happen (i. e., commissioning of new equipment, generating unit out of service for maintenance, exceptional climate conditions leading to uncommon load pattern, etc.)

Figure 9. From policy targets and roadmaps to deployment[62]



Expected deliverables for this output will include:

- 1.2.1. Workshop for the presentation of the scope and methodology that will be followed for the preparation of the NEP and its accompanying roadmap
- 1.2.2. Roadmap for the implementation of the NEP (minimum content described as per above)
- 1.2.3. Public gender-sensitive workshop for the presentation of the roadmap to country and sectoral authorities and relevant stakeholders
- 1.2.4. Assessment on how different levels of projected climate change impacts, including climate variability, in the project location can affect the pathways established in the roadmap
- 1.2.5. Assessment of the effect of the proposed pathways on climate vulnerability and adaptation, and measures to prevent potential risks
- 1.2.6. Assessment of potential redistributive effects of the proposed pathways included in the roadmap
- 1.2.7. Final roadmap presented for adoption by the Ministry of Public Infrastructure, Posts, and Urban Development

Output 1.3. The Government of St. Kitts and Nevis has improved institutional mechanisms for achieving the transition towards 100% renewable electricity generation.

The Ministries with responsibility for energy in the Federal Government and the Nevis Island Administration (NIA) currently collaborate using an informal mechanism. This output will create an adequate framework for inter-island cooperation and coordination through the creation of a special commission. The commission is to be composed by representatives of the ministries responsible for energy (and possible also for sustainable development).

Based on the current version of the NEP, functions and powers of this commission should include:

- o advice and assist the Ministry of Public Infrastructure, Posts, and Urban Development in the formulation and review of the National Energy Policy;
- o advice, assist and make recommendations to the Ministry on:
 - o efficiency in all sectors;
 - o reviewing and amending the energy planning;
 - o actions necessary for the implementation of the National Energy Policy and attainment of the objectives;
 - o actions necessary for the promotion of investments in renewable energy alternatives and energy efficiency in all sectors;
 - o any aspect related to the electrical interconnection between the islands of Saint Christopher and Nevis, and between them with other countries and islands of the region;
 - o any other issue linked to the National Energy Policy adoption and implementation.
- o Identify all aspects related to the promotion of use of renewable energy sources and energy efficiency
- o Identify and propose:
 - o opportunities for cooperation between the islands, in order to internalize economies of scale, streamline sector regulations, and avoid duplication of efforts

- o arrangements for such cooperation, for the consideration of authorities on both islands,
- o studies and analysis related to the potential, economic and technical feasibility of different renewable energy technologies and sources available in the country;
- o actions related to information and education campaigns necessary for the attainment of the objectives of this National Energy Policy;
- o any other aspect related to the formulation, review and implementation of the National Energy Policy.
- o Ensure an institutional framework of cooperation and coordination of policies between the federal authorities and the authorities of Nevis, and between the country with other countries of the region and regional institutions;
- o Co-opt a person to prepare any kind of studies or to advise it on matters of a technical or financial nature as necessary to carry out its functions and powers.

It is expected that this commission is created early in the proposal's workplan to allow for its participation in the remaining part of this project. The Commission will build upon work funded through the Government of St. Kitts and Nevis, as well as support provided by the Caribbean Development Bank to develop an Operational Framework and Training Plan to strengthen each island's energy units. This Commission goes beyond the work of the Government and development partners in developing a far reaching and participatory twin-island Commission. Appointment of this commission would ideally take place during the initial stages of this proposal, as the latter would be a key contribution to the coordination of the activities

Deliverables include the following:

- 1.3.1. Proposal: creation of a Federal Energy Commission, including roles, responsibilities, and gender considerations
- 1.3.2. 3-year workplan for the Federal Energy Commission, aligned to the National Energy Policy
- 1.3.3. Appointment of Federal Commission by the Federal Government and the Nevis Island Administration (NIA)

Output 1.4. The Government of St. Kitts and Nevis develops energy efficiency legislation to achieve the goals of the National Energy Policy.

This output will draft and pursue the adoption of a federal Energy Efficiency Act for St. Kitts and Nevis. The approach is to build upon recommendations from previous studies and the experience from other countries in the Caribbean and in Latin America to propose an act that establishes building energy codes, minimum energy performance standards, restrictions on incandescent bulbs and fuel economy standards. This output will consolidate recommendations from various projects into one act that is consistent with the revised NEP and is adapted to local circumstances. In particular, the proposed legislation will adopt the recommendations on energy building codes from the project "Improving Environmental Management through Sustainable Land Management in St. Kitts and Nevis" (GEF-6, ID: 9785), which in turn are aligned with the 2018 CARICOM Regional Energy Efficiency Building Code (supported by GEF-5 project ID: 4171); and incorporate the recommendations from the Eastern Caribbean Energy Labeling Project.

The transition to renewables will bring new challenges in terms of how the utilities collect revenue and how the Government deals with equity concerns through subsidies. For example, when households or businesses install their own solar power, they are also likely to retain their connection to the grid, which means that the revenue stream from these users is reduced while they still add to the peak demand and, consequently, to the sizing of the system. Likewise, new challenges will arise during the transition in terms of the subsidies. Currently, the Government pays a subsidy whenever the fuel surcharge in the tariff increases, which in effect creates a distortion in benefit of fossil fuels that will become more problematic as renewables take over a larger share of the generation mix. Therefore, in addition to introducing and adopting ready-made recommendations from previous studies, this output would also assess and provide recommendations in terms of the tariff structure used by the utilities and the subsidy scheme used by the Government, and how they provide adequate incentives and price signals that reflect the transitioning nature of the grid to consumers.

Expected deliverables, to be refined at PPG stage, will include:

- 1.4.1. Report: recommendations for a Federal Energy Efficiency Act in St. Kitt and Nevis based on local circumstances and regional best practices and codes
- 1.4.2. Proposal of an electricity tariff structure that is aligned with the energy efficiency guidelines in the NEP, the sustainability of the utility and the grid's transition towards renewables
- 1.4.3. Draft Federal Energy Efficiency Act presented for adoption by the Government of St. Kitts and Nevis

Output 1.5. The Government of St. Kitts and Nevis develops a strengthened knowledge management and monitoring systems for tracking the implementation of the National Energy Policy, roadmap and investment plan.

As discussed in the baseline section, St. Kitt and Nevis lacks data on and mechanisms for data collection for its electricity sector, a barrier that affects their policy and regulatory development. Data is a fundamental input for the roadmap, as these plans are typically data-driven and data-intensive. It requires comprehensive technical data on electrical demand and demand-side matters, the existing grid infrastructure, electrical supply assets and their performance. In addition to the technical energy system dataset, information on policy, social and economic statistics and hazard and vulnerability data also needs to be systematically collected and readily available. One inherent challenge to the data collection process is that such wide-ranging data is held across many different entities, which requires effective engagement and coordination.

This output seeks to enhance the organization and efficiency of the information and data management of public entities in St. Kitts and Nevis for the energy sectors. This output will support the development of a full record of all activities concerning electricity production, transmission, distribution, and consumption, and will support the preparation, evaluation of progress and subsequent revisions / updates of the roadmap. The system will also be used to monitor and record the data generated by the pilots detailed in component 2 and as a support for training and communications campaigns specific in component 3. The proposed output involves analyzing the current and future necessities of relevant public entities in terms of data management for these sectors. Based on these and other international practices, a software for data management will be selected for implementation. In selecting and implementing the system, activities will focus on ensuring that the system is endowed with enough resolution to capture gender differences, as well as its sustainability post project and developing a plan for broad roll-out. Activities will include the selection of a data management system based on criteria including system sustainability post project, its implementation and the deployment of required training.

Furthermore, the platform will play a key role in generating local public awareness on the benefits of decarbonization, both of energy supply and demand. The general public in St. Kitts and Nevis is not fully aware of the environmental, health and economic impacts of the current fossil-based grid and lacks knowledge and comprehension of the benefits and viability of a low-carbon and climate-resilient energy system. Local stakeholders are ultimately the main beneficiaries but also the ones that will experience the energy transition first-hand. Therefore, bottom-up support from civil society for the roadmap and adoption of the goals stated in the NEP are essential requirements for the success of this project. Aspects to be highlighted through the platform will include the implementation of measures on public buildings as part of the pilots (output 2.1), the benefits of a transition to a cleaner, more resilient grid, and an overview of the phases involved in the transition.

Proposed deliverables for this output include:

- 1.5.1. Report: design of the gender-sensitive data management system for the electricity sector, including identification of dataflows and data acquisition procedures, proposed nesting for the system and required technical and staff requirements for its implementation, proposed roll-out for the platform/software, and work plan for the acquisition of data
- 1.5.2 Design of public awareness modules and user-friendly platform for raising public awareness
- 1.5.3. Hardware, software and platform required for the knowledge management system as per deliverable 1.5.1
- 1.5.4. Training sessions for the operation of the knowledge management mechanism

Output 1.6. St. Kitts and Nevis government representatives and other key stakeholders demonstrate increased capacity on gender-sensitive implementation of the national energy policy, roadmap and investment plan.

A need for enhancing technical capacities has been identified in two elements that are key for the success of the proposed transition. The first one^[63] is tackled by this output and involves planning and regulatory aspects that will arise as the grid evolves from a simple, single-technology system into a more complex arrangement that uses newer technology and relies on different, interacting energy sources. This output will coordinate with other capacity building efforts, such as those provided by the European Development Fund and CDB (discussed in the baseline section). In principle, however, the latter is expected to take place sooner and focus on existing needs, whereas the capacity building to be prepared and delivered by this proposal will focus on challenges that are likely to arise during the different stages of the transition.

The long-term sustainability of this proposal will be further assessed and improved under the light of a realistic assessment of available resources in the country. While training and capacity building activities will aim to cover most of the ground required for a transition towards renewables, the list of specific topics in the many areas involved -administrative, technical (particularly, on geo-thermal), commercial, environmental, legal/contractual specifics in e.g. PPP, BOO, BOT, PPAs- can be well above any reasonable scale for an Energy Unit/Department in a SIDS^[64]. Thus, support from regional and international institutions will still be required even after this project. Therefore, this output will identify areas and topics that due to their technical, administrative or legal complexity require external support, identifying available sources for each topic and streamlining access to St. Kitts and Nevis' officials. Potential institutions to be considered during the design phase will include regional entities like CCREE, and global entities like IRENA or the Climate Technology Centre and Network (CTCN).

Proposed deliverables for this output include:

- 1.6.1. Training: planning for the grid expansion and a transition towards renewables
- 1.6.2. Training: regulatory, economic, and social aspects of the transitions towards renewables and high energy efficiency (includes a discussion on gender access to energy services and a discussion on gender issues during the transition)
- 1.6.3. Training: from single to multiple sourced grid electricity dispatching models
- 1.6.4. Detailed list of relevant administrative, technical, commercial, environmental, and legal/contractual issues beyond the long-term capacities of the energy units, including i) justification/rationale, ii) potential sources of support, and iii) recommendations for a streamlined access & modalities of cooperation.

Component 2: Demonstration of feasibility of high energy efficiency buildings and resilient grid-integrated renewable electricity generation

Outcome 2: St. Kitts and Nevis generates an increasing share of electricity through renewable energy and have increased resilience and energy efficiency in public buildings.

Component 2 is organized into a single output, described below.

Output 2.1. The government, academia, private sector and civil society stakeholders demonstrate increased awareness of the technical, economic, social and environmental feasibility of resilient high energy efficiency buildings and innovative grid-integrated renewable electricity generation through two pilots on the island of St. Kitts and two on the island of Nevis, based on existing energy audits.

The need for a pilot

As mentioned in the barriers section, in St. Kitts and Nevis the exposure of government and private stakeholders to energy efficiency and renewable energy projects has been scarce. While component 1 focuses on the enabling conditions, the roadmap might still face lack of confidence and awareness from local stakeholders, particularly Government, as to the viability of a transition to a fully decarbonized grid. In fact, buy-in from local stakeholders is fundamental for the implementation of the roadmap and for achieving the ambitious goals set out in the NEP. Thus, component 2 plays an important role in creating awareness and confidence amongst local stakeholders, demonstrating that such solutions are economically, technically, and socially sound. This will also play an important role in demonstrating to investors as to (1) the viability of such solutions and (2) evidence that the Government is committed to achieving the goals of the NEP.

The pilot project is conceived as an initial small-scale implementation that is representative of the main dimensions that are relevant for the project's objectives, i.e. to accelerate the transition towards 100% renewable electricity generation and 100% high energy efficiency public buildings in St. Kitts and Nevis, while at the same time improving the resilience of the country. These dimensions are:

- o the **technological dimension**, including energy efficiency measures and renewable generation capacity, and its integration and interaction with the grid. In particular, grid integration will require infrastructure investments (e.g. storage, smart transmission, grid reinforcements, distribution automation) and operational measures (e.g. demand-response programmes, adapted generation dispatch and control, network monitoring, improved resource forecasting);
- o The **logistic dimension**, including all relevant processes to acquire and deliver the system to the islands;

- o the **business dimension**, covering the contracting (including innovative elements, such as ancillary services and net billing schemes). This will also build upon the results and lessons learned from the Leclanché S.A. power plant.
- o The **institutional dimension**, including government capacity for regulating. This dimension will expand and build upon the institutional strengthening to be provided by the *Sustainable Energy Facility for the Eastern Caribbean* (GCF FP020).
- o the **financial dimension**, assessing the impact of new renewables on the utilities' capacity for long-term operation and maintenance
- o the **social dimension**, to demonstrate the benefits of renewable energies, and the successful integration of gender aspects in policy making
- o the **environmental dimension**, to demonstrate the GHG reduction potential and the linkages between the energy transition to renewables and the creation of resilience.

The pilot in component 2 will demonstrate the viability of innovative, replicable, and scalable renewable energy and energy efficiency solutions. It will do so by building upon the results of a series of audits financed the CDB's Sustainable Energy Facility, where opportunities for small scale renewable generation and energy efficiency measures were identified.[65] The pilot will thus enable the GSKN to better understand and manage risks and identify any issues before substantial resources are deployed.

Pilot approach: rationale and replicability

While the specifics of the pilots will be defined during the PPG phase, the proposed approach at PIF stage is to build upon the results of the 2018 energy audits as they provide a thorough assessment that covers 35 public facilities in both islands for which detailed information on energy consumption, costs and potential savings is readily available. This will provide the project team with otherwise scarce data right from the start of the workplan. The aim is for this pilot to adapt and implement the most innovative elements arising from the audits, demonstrating the realization of potential savings and innovative grid integration.[66]

-

The approach chosen for the pilots is to have one generation and one energy efficiency pilot on each island, for a total of four micro-scale interventions (i.e. one generation and one energy efficiency pilot in St. Kitts; plus one generation and one energy efficiency pilot in Nevis). The choice to include small pilots on both islands is to ensure that the benefits are shared equally among the population of St. Kitts and the population of Nevis, as buy-in from local stakeholders is crucial for the success of the project.

-

The *generation pilots* proposed under this PIF consist of the addition of a solar PV micro-power plant at existing pumping stations in St. Kitts (the Taylor's Pumping Station) and Nevis (Camps Booster Water Pump). The choice of the water pumping stations is rooted on adaptation considerations regarding the water and energy nexus, which became more profound after the impacts from hurricanes Irma and Maria in September 2017. During these events, high winds caused fallen poles and downed power lines resulting in the interruption of electricity to power the pumps for the wells. Therefore, the Government of Saint Kitts and Nevis is taking steps to ensure that measures are put in place within the water and energy sector to ensure that basic needs such as water can be provided to the population, particularly to the most vulnerable in the society who are more severely impacted when these natural disasters affect the country. An increasingly large share of the potable water used by the population is sourced from shallow wells located across the country and that require energy to be able to pump water into the supply network.

-

The measures to be considered for the generation pilots had been identified as theoretically viable options during the 2018 energy audits. A total of 54 measures have been identified at 19 water pumping stations in St. Kitt and in Nevis, but none of these have been implemented to date due to the barriers listed in this PIF.

During the preparation of this proposal (and conditional on the results from the feasibility assessment to be undertaken during the PPG phase), a suggestion was made to include additional in-line micro-hydro (<100 kW) capacity with a raised tank system as a way of having both daytime generation (solar) and night-time gravity flow for additional generation (hydropower), a scheme that would be a first-of-its-kind project in St. Kitts and Nevis. This way, the pumps fill in the tanks during sunny hours, and the water sent to distribution systems can activate a micro hydro generator that would provide additional electricity, further increasing the efficiency of the pumping station. While the pilot of St. Kitts would have a bi-directional connection to the grid, the pilot in the Nevis pumping station would be connected to the grid but only for passive consumption whenever the renewable sources are not available. Thus, the project touches on different elements that are central to the energy transition, i.e. the installation of renewable capacity, innovative approaches to maximizing the renewable resource, grid integration under different arrangements, and improvements in the resilient management of a key resource: water. If the feasibility of this concept is confirmed during the PPG phase, a successful pilot implementation would trigger the replication of similar approaches throughout the remaining water pumping stations in the country, replacing imported fossil-fueled grid generation by resilient, on-site, renewable electricity.

As for the *energy efficiency pilots*, the concept also stems from the same study (i.e. the 2018 energy audits). Like in the case of the water pumping stations, none of the 60 measures for the 16 main administrative buildings in the country were put on practice to this date. The proposed project would implement energy efficiency measures in two high-visibility public buildings, one in St. Kitts, and one in Nevis. Implementing these measures will constitute an important showcase to stimulate market transformation towards more efficient products, buildings and services, as well as to trigger behavioral changes in energy consumption by citizens and enterprises.

The specific buildings where the energy efficiency measures will be implemented are still under evaluation and will be determined during the PPG phase after an on-site assessment. Measures that are not implemented directly through GEF funds as part of this output will be compiled and further developed into fully bankable proposals through output 3.1, ensuring the replicability of the pilot to the remaining public buildings in the country.

Possible pilots

The exact pilots will be determined during the full project development, based on the decision of the Government of St. Kitts and Nevis. Preliminary possible ideas for the pilots, consisting of four micro-scale interventions, are summarized in the table below.

Table 9. Criteria for the pilot proposal

Pilot	Criteria for selection, benefits, and beneficiaries
1.a) and 1.b). Energy efficiency measures in high-visibility public buildings (finance administration, hospitals, airport, schools) on each island. The exact measures to be included in this proposal are under evaluation and will be determined during the PPG phase, based on the recommendations from the 2018 energy audits and consultation with Government technicians.	<ul style="list-style-type: none"> o Public buildings are expected to play a key role in the early stages of the transition - even before renewable capacity starts displacing fossil fuels. They are affected by “soft” barriers that can be addressed quicker, as opposed to the “hard” technological barriers that require lengthy studies or high capital investments. o Important showcase to stimulate market transformation towards more efficient products, buildings and services, as well as to trigger behavioral changes in energy consumption by citizens and enterprises. o Decreasing energy consumption through energy efficiency improvement measures can free up public resources for other purposes.

Objective and description: Achieve a large de

monstrative effect that increases the general public's buy-in of the energy efficiency legislation that will be introduced as part of output 1.4.

2.a) Integration of a solar PV micro-power plant at the Taylor's Pumping Station (St. Kitts).

Objective and description: Offset utility fossil fuel power supply with pump-storage-micro hydro system, consisting of hybrid solar PV and in-line micro-hydro (<100 kW). A raised tank system would be needed for sufficient head pressure. Battery storage (in addition to the water storage) will be considered.

This system would be grid-integrated, use smart meters and be capable of exporting energy.

- o Largest water pumping station in the country.
- o Diversification of clean power options.
- o High energy consumption = 381,888 kWh/annum.
- o Largest potential CO₂ savings among water stations = 302,738 kg CO₂/annum.
- o Day time generation (solar); night-time gravity flow for generation (hydro-power). Hydro system is in-line therefore does not substantially change pipeline infrastructure.
- o Solar energy maximization due to storage (dependent on tank capacity).
- o Requires negotiation of a feed in tariff.
- o Increased water security due to additional tankage.
- o Battery system to increase autonomy of the site in case of grid failure
- o Reduce electricity cost (lower grid consumption).
- o Increased financial viability due to savings.
- o Increased water supply security.
- o Possibility for limited operations in the event of grid failure.
- o To be coordinated with the Water Department and SKELEC

2.b) Integration of a solar PV micro-power plant at the Camps Booster Water Pump (Nevis).

Objective and description: Offset utility fossil fuel power supply with pump-storage-micro hydro system, consisting of hybrid solar PV and in-line micro-hydro (<100 kW). Raised tank system would be needed for sufficient head pressure. Water storage will be used as battery.

This system would be connected to the grid only as a backup / to import electricity in the absence of the renewable resource. Hence, a current blocker to arrest current flow to grid will be required.

- o High energy consumption = 452,091 kWh/annum.
- o Potential for energy savings = 89,100 kgCO₂/annum.
- o Day time generation (solar); night-time gravity flow for generation (hydro-power). Hydro system is inline therefore does not substantially change pipeline infrastructure.
- o Solar energy maximization due to storage (dependent on tank capacity).
- o No requirements for feed in tariff.
- o Increased water security due to additional tankage.
- o Battery system to increase autonomy of the site in case of grid failure
- o Reduce electricity cost (lower grid consumption).
- o Increased financial viability due to savings.
- o Increased water supply security.
- o Possibility for limited operations in the event of arid failure.

- o To be coordinated with the Nevis Water Department and NEVLEC
-

As identified in the 2018 audits, water pumping stations show the highest potential in terms of energy savings and emission reductions, with estimated savings of up to 5.15 million kWh per year in both islands ($\equiv 2,786 \text{ tCO}_2/\text{yr}$).^[67] Water pumps are also essential in terms of resilience, as their dependency on the electric grid as sole provider of power has proven to increase water insecurity, as discussed in the baseline section. For a power system to be resilient, it must be capable of islanding and operating independently from the grid during outages. Installed with additional hardware—including transfer switches, critical load panels, and appropriate controls—these systems can act as self-sufficient microgrids, generating energy and powering critical loads until utility services are restored.^[68] The introduction of on-site renewable generation capacity in the form of a hybrid solar / hydro micro system will play a key role in terms of building resilience by reducing the dependency of water pumping facilities on distribution lines, allowing the water to keep flowing even in the event of an outage in the grid.

The pilots in the water pump facilities are innovative in the sense that they combine two different types of renewables and use water storage as a way to store *energy*. This way, the pumps fill in the tanks during sunny hours, and the water sent to distribution systems can activate a micro hydro generator that would provide additional electricity. The proposed pilots would also serve to assess two different arrangements for interacting with the grid. The pilot in St. Kitts would make use of existing smart metering capabilities to install a system that can also feed into the grid; whereas the pilot in the Nevis pumping station would be connected to the grid but only for passive consumption whenever the renewable sources are not available. These competing layouts can inform the choice between a centralized/utility-sized grid versus a de-centralized model. As discussed in the context of output 1.1, the decision regarding the grid model that is suitable for St. Kitts and Nevis is one of the core answers that is expected from the NEP, as this choice will result in two very distinct development pathways.

Energy efficiency measures in public buildings, in turn, constitute an important showcase to stimulate market transformation towards more efficient products, buildings and services, as well as to trigger behavioral changes in energy consumption by citizens and enterprises. Furthermore, decreasing energy consumption through energy efficiency improvement measures can free up public resources for other purposes. Public buildings can therefore fulfil an exemplary role as regards to energy efficiency, having a large demonstrative effect that increases the general public's buy-in of the energy efficiency legislation that will be introduced as part of output 1.4^[69]. With this in mind, high-visibility buildings (e.g. finance administration, hospitals, airport, schools) will be prioritized for this pilot.

Lastly, both pilots will serve to provide lessons learned regarding the deployment of renewables, as well as to inform on the potential impact of renewable capacity on the utilities' revenue stream (of relevance to output 1.4). Moreover, the choice for these pilots has the additional advantage of a strong complementarity with identified co-finance. For example, the renewable generation pilots will strongly benefit from the grid integration of the Leclanché solar PV project, as well as upon the experiences and lessons learned from this project's execution. Similarly, the resources from the European Development Fund (EDF) will support the Government in building resilience and ensuring that the population can meet their basic water and energy needs when the country is severely impacted by weather events. The Government of St. Kitts and Nevis has taken steps to install underground electrical power supply to three water pumping stations in advancement of its partnership and commitment outlined in the objective of the 11th EDF Sector Budget Support to further increase the resilience in the sector.

The following deliverables are under consideration for this output. All the reports will feed into the knowledge management platform (output 1.5):

- 2.1.1 Detail design of the pilots on the island of St. Kitts and the island of Nevis, including operation manuals and contingency plans. The design study will also include a rationale for their relevance in the context of the roadmap, the NEP and the transition towards a 100% renewable, high efficiency electricity grid.
- 2.1.2 Pilots commissioned and implemented as per approved design
- 2.1.3 Monitoring system, with recorded data incorporated into the knowledge management system (output 1.5)
- 2.1.4 Report: Lessons learned and recommendations. Including considerations on: logistic aspects, contractual design, financial sustainability for both utilities (water and electricity), centralized vs de-centralized modality, grid integration (infrastructure and operational measures), adaptation and resilience considerations for the provision of water in case of grid disruptions during natural disasters, replicability of the experience in other water pumping stations in the country

Component 3: Financing and delivering the transition towards a 100% renewable grid

Outcome 3: The Government of St. Kitts and Nevis obtains commitments for increased investments aligned with the revised national energy policy

Component 3 supports St. Kitts and Nevis with obtaining investment for implementing its roadmap and investment plan (output 1.2), to achieve the goals of its national energy policy (output 1.1). It aims to ensure that the regional and international financing community are fully aware of these opportunities contained in the roadmap and investment plan, including the developed pipeline of projects (output 1.2). It also aims to ensure that as investment is mobilized, St. Kitts and Nevis has the capacity, tools and systems in place to efficiently translate this investment into implementation on the ground. This component consists of four outputs, depicted below:

Output 3.1. Officials in governmental, technical academic and private institutions demonstrate increased capacity in the development, assessment and appraisal of bankable renewable energy and energy efficiency projects aligned with the National Energy Policy.

This output will provide professional training on the preparation of bankable renewable energy and energy efficiency projects. It will build upon the capacity building activities that will be undertaken through the 11th EDF Sector Budget Support and target women and socially disadvantaged groups as a way to empower them to access the new jobs that the energy transition is expected to offer. Where possible, the project will follow a train-the-trainers approach to maximize impact, and hence academic institutions will be engaged for participating in this process. It will also serve to disseminate the demonstration's progress and results, creating the capacity needed to produce a robust pipeline of renewable energy and energy efficiency projects. The training is expected to undertake one real-case exercise, producing a consolidated bankable package for all the energy efficiency measures that are not included in the pilot (around 90% of the total measures identified in Table 6 in the baseline section).

The following deliverables will result from this output:

- 3.1.1 Training materials on the development, assessment and appraisal of bankable renewable energy and energy efficiency projects, including risk, break-even and sensitivity analyses
- 3.1.2 Training sessions: development, assessment and appraisal of bankable renewable energy and energy efficiency projects
- 3.1.3 Training real case application: consolidated bankable package for all the energy efficiency measures from the 20 18 audits that are not included in the pilots

Output 3.2. The Development Bank of St. Kitts and Nevis has improved financing mechanisms to finance micro, small and medium-sized enterprises (MSMEs) investments in renewable energy and energy efficiency.

This output will create a blended mechanism for the financing of renewable energy and energy efficiency measures that are aligned to the NEP and the roadmap. It will be targeted to micro, small and medium-sized enterprises, including energy service businesses. The mechanism will be designed to ensure blended finance is only deployed for uses where commercial financing is not currently available^[70], and have an explicit focus on opportunities to crowd in financing from commercial sources into transactions that deliver the intended impact. Partnering with the Development Bank of St. Kitts and Nevis will ensure that the mechanism is tailored to the local reality.

This output aims to reduce financial barriers involved in the implementation of energy efficiency and renewable energy capacity measures by reducing the initial capital cost requirements, while also attracting the participation and investment of private actors. The concept is that a blended financing mechanism will be constituted at the Development Bank of St. Kitts, with the specific elements to be designed during the project preparation phase.

Proposed deliverables (to be further refined during the PPG phase):

- 3.2.1 Detail design for the blended financing mechanism chosen, including eligibility measures, alignment with the NEP and the roadmap, roles and responsibilities, resources needed (staff, equipment, etc.)
- 3.2.2 Financial model simulating the operation and the impact of the fund, including risk and break-even analysis, from the point of view of the main actors in the mechanism (i.e. development bank, micro, small and medium businesses)
- 3.2.3 St. Kitts and Nevis Development Bank RE/EE blended financing mechanism, capitalized and ready to finance eligible measures

Output 3.3. Regional and international investors demonstrate increased awareness of the business opportunities in the renewable and efficient energy sector in St. Kitts and Nevis.

The implementation of the roadmap will require substantial financing that can take the form of grants but also equity from private actors and concessional lending where fiscally feasible. Their support is another necessary condition for the success of the transition. Buy-in from local, regional and international stakeholders is fundamental for the implementation of the roadmap and for achieving the ambitious goals set out in the NEP. While the NEP and its roadmap

aim to generate top-down momentum for transitioning to a 100% renewable, high efficiency and resilient grid, this output focuses on a communication and engagement campaign and match-making between high-capital regional and international partners and local actors, encouraging both to invest and participate in the implementation of the roadmap.

In order to ensure the buy-in required to achieve the mobilization of the funds required for the transition, an engagement strategy will be prepared to involve:

- Development partners, e.g. World Bank, Inter-American Development Bank, OECD, European Union, Japan International Cooperation Agency (JICA), U.S. Agency for International Development (USAID), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Agence Française de Développement (AFD), and others;
- Regional entities, e.g. CARICOM, Eastern Caribbean Central Bank (ECCB), Caribbean Development Bank (CDB), the Economic Commission for Latin America and the Caribbean (ECLAC), among others;
- Technical organizations (IRENA, the Technical Assistance Programme for Sustainable Energy in the Caribbean (TAPSEC), the CCREE, the Climate Technology Centre and Network (CTCN), and others;
- Private sector and local entities, e.g. Development Bank of St. Kitts and Nevis, St Kitts- Nevis- Anguilla National Bank Limited, First Caribbean International Bank, Bank of Nevis; SKELEC, NEVLEC, Chamber of Industry and Commerce (SKNCIC), SKN Hotel & Tourism Association. WindWatt, Leclanché, and others to be identified during the PPG phase.

The engagement strategy will allow the country to consult and incorporate the views of key local, regional, and global stakeholders that will be involved in the mobilization of funds required for the transition, informing the policy and institutional arrangements in component 1, more specifically, the revised NEP (output 1.1) and the roadmap and the investment plan (output 1.2). It will seek to incorporate local stakeholder views, needs and priorities into the planning process, to ensure their social and economic viability and sustainability. The results of the consultations will be shared with the Federal Energy Commission (output 1.3), as a way to enhance coordination for the development of a feasible and efficient policy. This information will also serve as a key input for the design of the financial instruments (output 3.2), and the active engagement of these stakeholders will be critical for the replication of the pilots (component 2). Recommendations for a long-term consultation mechanism will be developed and delivered to key government actors.

The communication campaign will focus on raising awareness about St. Kitts and Nevis's ambition and its preparedness through the development of a comprehensive enabling environment in component 1. Designed almost like an advertising campaign, the communication strategy will aim to retain the engagement level of key players, attract potential new ones, present the key elements of the roadmap and the investment opportunities that arise from it, as well as progress made in terms of the pilots and the implementation of other elements of this GEF project.

Due to its cross-cutting nature, this output will build upon co-financing from all of the identified sources and be strongly connected to the project's knowledge management mechanism. Deliverables that are produced as part of the communication campaign will feed directly into the data management system that is to be implemented as part of output 1.5.

Proposed deliverables:

- 3.3.1 Multi-stakeholder consultation, engagement and communication strategy on the development, financing, and implementation of the National Energy Policy
- 3.3.2 Implementation of the consultation and engagement activities in the strategy, including at least two participatory workshops per year
- 3.3.3 Implementation of the communication campaign, including high-level national investment expo for regional and international investors

iv) Alignment with GEF focal area and/or Impact Program strategies;

This programme is aligned with Objective 1 of the Climate Change Focal Area to “Promote innovation and technology transfer for sustainable energy breakthroughs”, through CCM 1-3 - Promote innovation and technology transfer for sustainable energy breakthroughs for accelerating energy efficiency adoption.

v) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing;

The project aims to set in motion an energy transition from a 95% diesel-fueled electricity grid towards a 100% renewable-based system in St. Kitts and Nevis. The grant funds provided by the GEF and complemented by co-funding aim at de-risking investments in renewable power generation and energy efficiency measures in the context of a Caribbean small island developing state with less than 60 thousand inhabitants and vulnerable to extreme weather events, as well as to attract additional funding from private actors and climate finance mechanisms and other means of concessional financing.

GEF-financing will assist St. Kitts and Nevis in overcoming the persistent barriers depicted in this PIF, setting the path towards a green electricity grid. The revision of the National Energy Policy, the provision of a detailed set of actions to implement it, and the strengthening of the local institutional capacity will be instrumental in catalyzing the shift towards a sustainable, zero-emission electricity grid. The project will thus provide an initial contribution that will lead to a fundamental transition in the system, reducing St. Kitt and Nevis’ dependence on imported fossil fuels that affect its balance of payments. Funds will be used to revise the outdated National Energy Policy, as well as for the preparation of a detailed roadmap and to facilitate the regulation required for its implementation. Moreover, a portion of the funds will be used to implement small scale renewable generation pilots that are relevant for the demonstration of all the dimensions of the roadmap: technology and grid integration, logistic and business models, human resources and financing.

The following describes the incremental cost logic of the project in building upon these key existing efforts:

- The **Sustainable Energy for the Eastern Caribbean Programme** (SEEC) creates the **Sustainable Energy Fund** (SEF), a multi-donor effort that is split across various countries in the Eastern Caribbean. 16.35 million (68%) of the SEF funds assigned to St. Kitts and Nevis represent GCF funding, which focuses specifically on Geothermal Energy [71]. While geothermal energy is one of the main sources of energy that is expected to play a role in the energy transition, other issues are also expected to be fundamental (wind and solar energy, battery storage, centralized vs distributed generation, grid integration, adaptation & resilience, among others). Thus the incremental logic of the GEF project is to build upon the SEEC/SEF investments in geothermal, by building a broad and sound enabling environment for facilitating the country’s transition to decarbonization. SEF GEF funding, on the other hand, is limited only to interventions in

Antigua and Barbuda, Grenada and St. Vincent and the Grenadines¹⁷⁴. The remaining funds in the SEF that are available to St. Kitts and Nevis include mostly loans from JICA and the IADB; these are the sources that funded the energy audits that are used as one of the main inputs for the conceptualization of the pilot under this project. Here the incremental logic is to build upon these audits by piloting these and demonstrating the feasibility of building retrofitting and RE introduction, as well as initiation creation of required market actors.

- Assistance from the **European Development Fund (EDF)** consists of a grant to promote the integration of renewable energy and energy efficient technology in public facilities. The programme also supports the government to build resilience within the energy and water sectors, to ensure that the population has access to the basic needs of water and electricity when the country is severely impacted by natural disasters such as hurricanes. Some specific outcomes will include the installation of energy efficient streetlights, the installation of underground electrical power supply to three pumping stations and the development of an operational framework and training plan for energy units in the country. These efforts will be essential to the achievement of the objectives in the proposed GEF project. EDF assistance will also be used to create technical capacity through the strengthening of Energy Units in St. Kitts and Nevis, which will be among the main stakeholders for the trainings on regulatory and technical elements involved in a transitioning grid (output 1.6) of the current GEF project. The energy efficient lighting and the implementation of underground electrical power supply will be direct contributions aligned with this GEF proposal, increasing energy efficiency and improving the resilience in the access to water – both of which are a direct contribution towards outcome 2).

- On the contribution from the Leclanché solar PV farm, the incremental logic of the GEF project is to build upon these investments in solar, by building a broad and sound enabling environment for facilitating the country's transition to decarbonization. This investment is a key step in the direction of decarbonization; however, a full transition to 100% renewable energy can only be achieved through the development of a comprehensive policy, strategy, institutional arrangements, and regulations, which the GEF project will support St. Kitts and Nevis to develop.

vi) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and

Total top down emission reduction potential 2023 to 2043, tCO₂	
(1) Total direct emission mitigation	16,015
(2) Total indirect impact emission mitigation	455,540
Total project related emissions reductions (1) + (2)	471,555

This preliminary emission reduction estimate is based on 20-year projections (2023 – 2043) for the baseline and the alternative scenario. Population on the islands increases equally in both scenarios and in line with the growth observed in the last five years of data. The grid emission factor was estimated in line with UNFCCC's methodology^[73], using default IPCC emission factors for diesel. Emission reductions take into account both supply (renewable vs fossil fuel sources, transmission losses) and demand (i.e. reductions in consumption from the adoption of energy efficiency measures).

Socio-economic benefits

-

According to the 'Global Energy Transformation: Roadmap to 2050' report by the International Renewable Energy Agency (IRENA)[74], the transition to renewable energy will significantly improve the global socio-economic footprint of the energy system. The report forecasted that globally by 2050, the decarbonization of the energy system will generate a 15% increase in welfare, one percent increase in gross domestic product (GDP), and 0.1% in employment.

Impacts on specific economies may differ based on potentials, national endowment, and current economic output. In St. Kitts and Nevis, a tourism-based economy that relies on petroleum imports, a positive impact can be expected for the balance of payments and the GDP if the tourism sector capitalizes the benefits of a country with 100% green electricity. Moreover, gains in welfare from the energy transition will further emphasize the impact in GDP in the long run. The energy transition is expected to generate broader socio-economic benefits, including from the impact of expenditure in human capital and education, reduced health impacts from air pollution, reduction of greenhouse gas (GHG) emissions and depletion of natural resources, and an overall improvement in resilience.

For employment, the energy transition as the one proposed in this project is also expected to generate positive impact in almost all regions and countries, although it will fluctuate over time. The expected impact of the measures to be proposed by this project will be assessed in a dedicated deliverable, where redistributive aspects of the transition will be considered (see output 1.2).

vii) Innovation, sustainability, and potential for scaling up.

Innovativeness:

The project is highly ambitious in terms of the changes it intends to mobilize in the energy sector, by setting the conditions for a radical change in the business-as-usual operation. This will require the introduction of innovations in several grounds:

o *Technical:* Renewable energies are very incipient in St. Kitts and Nevis, with only 5% of its generation mix being provided by renewable energies according to latest data[75]. The intended energy transition will require planning, assessing and deciding upon a path that will bring different technological challenges depending on the stage. Initial stages of renewable energy penetration will require modernizing the grid, setting the institutional framework and advancing on the studies for projects in the pipeline. As renewables take over a more predominant share of the grid, the country will require the introduction of storage, along with sophisticated control systems, synchronous condensers, dump loads, and other enabling technologies to maintain system stability in diesel-off mode. The pilot will be the very first experience in integrating renewables into water pumping stations used for the provision of drinking water. In doing so, the pilot increases the resilience of the water supply by reducing its dependency on the currently centralized, fossil-fuelled grid, a necessity that was made visible after the disruptions caused by hurricanes Irma and Maria in 2017. Moreover, the pilots will assess an innovative layout that will maximize the usage of the renewable resources, by including in-line micro-hydro capacity with a raised tank system as a way of having both daytime generation (solar) and night-time gravity flow for additional generation (hydropower), a scheme that would be a first-of-its-kind in St. Kitts and Nevis. Battery capacity will also be assessed (to be defined at the latest as PPG stage) to maximize the resilient operation of the water facilities.

o *Institutional:* In its core, the project is designed to create a bridge between technical feasibility and actual implementation. By establishing the actual steps required to implement the goals set out in the NEP and the NDC, the project will add substance to the policy discussion, bringing light to the achievements from the past and the challenges of the future. It will also introduce a formal coordination structure between the two islands (output 1.3), which is expected to

avoid duplication of efforts and facilitate cooperation in addressing common barriers. Moreover, the pilots in component 2 will also bring in institutional innovations, as they will require additional institutional arrangements to establish e.g. a feed-in tariff for water pumping stations that are able to sell energy into the grid.

o *Business:* In setting the enabling conditions that are required for the implementation of the roadmap, the project will introduce a number of innovations in the way that the sector conducts business. The transition towards a grid that is increasingly intense in the use of renewables will demand innovative elements such as public-private partnerships for the implementation of capital-intensive projects, modern business plans for the utilities, standardized contracts for land and rooftop access for the installation of solar PVs and for the compensation of ancillary services from IPPs.

o *Social:* While most of the elements in this project are technical, several elements pose social innovations too. By introducing gender aspects into the NEP, the revised policy framework will be endowed with enough resolution to capture and confront gender inequalities in access to energy (in particular, renewables) and benefits derived from energy efficiency improvements.

o *Environmental:* In terms of environmental innovativeness, the project provides a unique opportunity to design the path for reducing and eventually eliminating the energy sector's carbon footprint. Its holistic and ambitious approach sets an example that can be replicated in other sectors and other SIDS. This project will serve as a reference for other countries which share St. Kitts and Nevis ambition and have a similar starting point.

Sustainability:

This project was conceived to drastically reduce GHG emissions in the electricity sector of St. Kitts and Nevis. By providing a roadmap with concrete actions that are aimed at the core elements in the market and that take into account the specific national circumstances, the project is expected to identify and establish a feasible path towards full decarbonization of the country. The project is holistic in the sense that it leaves no aspect outside of its scope, covering both demand and supply elements, as well as institutional, financial and human resource aspects of relevance to fulfil the objectives.

In order to ensure that its outputs have the intended long-term outcome and impact -i.e. that St. Kitts has a 100% renewable grid- several assumptions will need to hold true, including the involvement of stakeholders in project design and implementation, coordination with ongoing projects, alignment of incentives for the private sector, availability of affordable capital and qualified labor to implement the numerous technological changes, and a persistent political will. However, significant emphasis is being placed in the identification of the key assumptions, drivers, and thresholds under which the greening of the grid can materialize. A thorough risk analysis separating challenges affecting the implementation of the GEF project activities to those arising from the roadmap itself will be prepared in the design phase of this project; a preliminary mapping of these risks is available later in this PIF.

Several outputs in the log-frame are expected to ensure the sustainability of the project outcomes:

o The creation of a Federal Energy Commission with representatives from both islands will help coordinate and connect projects, determine synergies amongst them, identify unattended requirements and/or barriers and establish an overall comprehensive approach. This will help maximize the impact of both private and public investment and activities.

o Investment in energy efficiency measures will be facilitated by the creation of a blended financing mechanism that will make funds readily available for small-to-medium enterprises to implement further energy efficiency measures.

- o Training on the assessment and appraisal of renewable energy and energy efficiency projects will endow the country with the know-how to produce a bankable portfolio of projects and measures, thus facilitating the participation of the private sector, climate finance mechanisms and other development partners.
- o The multi-stakeholder Technical Advisory Committee established for the execution of the project will help steer the preparation and subsequent implementation of the energy transition roadmap, including identifying social aspects of the transition in order to mitigate any distributional aspects arising from the deployment of renewables are well understood and mitigated, as needed.
- o The gender aspects embedded in the project will ensure a socially equitable distribution of costs and benefits of the transition to renewables.
- o The long-term sustainability of the outputs will be further improved through strategic partnerships with regional and global institutions such as CCREE, TAPSEC and IRENA. A proposal for the outsourcing of technical, regulatory and commercial services for which long-term resources in the Energy Units cannot be guaranteed will be prepared as part of this proposal (output 1.6).

In terms of its own activities, the project will mostly involve desk work: appraisal of existent portfolio of renewable projects, desk and on-site review of the conditions of the existent grid, compiling of sectoral data, undertaking of computer simulations and projections, preparation of reports, meetings with relevant stakeholders and preparing and delivering capacity building activities. A pilot project^[76] involving renewable generation and grid integration will be designed during the PPG phase to demonstrate the viability of the roadmap “in the field”. Although a specific assessment of its environmental impact will be undertaken prior to its implementation, its small scale (<0.5 MW) will ensure that any potential adverse impacts can be fully mitigated. A more detailed assessment will be presented in the CEO Endorsement Document, once the specific intervention is fully characterized.

Potential for scaling up:

-

This project is conceptually conceived to be the first out of several efforts that will ultimately result in the full decarbonization of the electrical grid in St. Kitts and Nevis:

- o By providing a streamlined pathway (i.e. the roadmap and investment plan) that shows concrete, costed actions that are fully directed towards a policy backed goal (i.e. the NEP), the country will send a clear message to potential investors and financiers, bringing clarity and reducing perceived or possible risk. The analysis of the state of the situation and future requirements in terms of capacity and grid infrastructure will help direct investment from the private sector and international cooperation, facilitating the implementation of the renewable energy transition.
- o The pilots that will be undertaken with GEF funds are expected to demonstrate innovative renewable solutions^[77] as well as their integration with the grid, providing further technological de-risking. The pilots will be designed to bring in elements that are representative of all the dimensions of the energy transition, including the technologies, their ability to interact with the grid, the required logistic to have them delivered and commissioned in St. Kitts and Nevis, the business model through which it will interact with the country and the utility, institutional arrangements, etc. Thus, the pilot will serve as a demonstration of the viability of the roadmap itself, building confidence in potential investors and financiers and enhancing the credibility of the country's political intent. During the 2018 energy audits on which the pilots are based, it was assessed that similar measures could be applied in at least 14 out of the total 19 pumping stations throughout the country; component 1 and 3 will create the enabling conditions for the replication of similar experiences across the remaining sectors of the economy. Similarly, the energy efficiency measures to be implemented in the buildings in St. Kitts and Nevis could be quickly replicated in other 14 of the main public buildings in the country, for which concrete measures have already been identified.
- o A package of readily-available “low hanging fruit” projects and energy efficiency measures, including applicable business models, will be ready for public, private or mixed investors right upon finalization of the GEF project. The pilots would provide experience to demonstrate the viability of this package, decreasing its risk. A portfolio of larger, long-term investments on each island including geothermal, wind, solar, micro-hydro/solar hybrid systems for water pumps, battery storage and grid improvements will also be identified during the project.

- o Local micro, small and medium enterprises will benefit from the blended financial mechanism, which will target energy efficiency improvements within their operations. This will provide an additional channel through which the private sector will be able to play an active part in achieving the goals set out in the NEP. The engagement and communication strategy (output 3.3) will ensure that the experiences from the pilots reach the private sector. This creates the conditions required to replicate similar energy efficiency improvements in the residential, commercial and industry sectors of the country.
- o Furthermore, incorporating civil society and other pertinent local and regional stakeholders in the project, in particular in the different capacity building activities and through the communication and engagement strategy will help forward the discussion towards a 100% renewable-based grid but also identify business opportunities that spin off the development of a new ecosystem. The growth of the latter will help consolidate investments and promote the scale-up of the entire endeavour.
- o The knowledge management mechanism will play an essential part in replication, systematically collecting and disseminating lessons learned to relevant stakeholders, identifying what works, what to avoid, potential savings in terms of electricity and emissions (and potential costs), and gains in resilience and autonomy from the grid. It will also play a key role in terms of technical information for the management of the transition, allowing to transparently document ways in which residential and commercial users can bring in renewable capacity without compromising the stability of the grid. Thus, the knowledge management system will provide transparency and signal to the wider public the price and technical conditions to inform their investment decisions.

[1] International Energy Agency, *Untapped potential for climate action. Renewable energy in Nationally Determined Contributions* (2017)

[2] St. Kitts And Nevis National Climate Change Policy – November 2017. Note that the iNDC became the Nationally Determined Contribution upon ratification of the Paris Agreement in 2016.

[3] International Energy Agency, *Global Energy & CO₂ Status Report* (2019)

[4] Calculated based on data from the [World Bank](#) and the [Observatory of Economic Complexity](#) for 2019.

[5] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015).

[6] Source: [worldometers.info](#). Note that these are not official estimates. Latest official data corresponds to that presented in the 2015 Second National Communication, which includes estimates up to 2008.

[7] These barriers are presented in the context of a larger discussion in the coming baseline section.

[8] UN-OHRLLS, *Small Island Developing States – Small Islands Big(ger) Stakes* (2011)

[9] Government of St. Kitt and Nevis, *Revised National Energy Policy* (2014), p. 3.

[10] U.S. Department of Energy - Energy Transitions Initiative, *St. Kitts & Nevis – Energy Snapshot* (2020).

[11] Government of St. Kitt and Nevis, *Intended Nationally Determined Contribution* (2015), p. 4.

[12] The tariff structure is presented at greater length in the baseline section.

[13] See e.g. Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015) p.27

[14] Government of St. Kitt and Nevis, *Progress report on the implementation of the National Energy Policy* (2020) p.8

[15] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015).

[16] United for Efficiency, *Country assessment: Saint Kitts and Nevis* (2019).

- [17] Government of St. Kitts and Nevis, *Progress report on the implementation of the National Energy Policy* (2020)
- [18] The Office of the High Representative for the Least Developed Countries, Landlocked Countries and Small Island Developing States, *Policy Brief #13: achieving SDG 7 in Small Island Developing States—mid-term review of the Samoa pathway* (2019).
- [19] IRENA, *SIDS Lighthouses Initiative. Progress and way forward* (2021)
- [20] Government of St. Kitt and Nevis, *Progress report on the implementation of the National Energy Policy* (2020), p.10
- [21] For example, the effective capacity in Nevis is 11.8 MW, whereas nominal capacity is 19.7 MW (i.e. effective capacity is 60% of nominal capacity).
- [22] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015), p. 9
- [23] SKELEC, *System Overview* (2013). Retrieved from <http://www.skelec.kn/component/content/category/87-electricitydocuments.html>
- [24] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015)
- [25] U.S. Department of Energy - Energy Transitions Initiative, *St. Kitts & Nevis – Energy Snapshot* (2020).
- [26] It is estimated that the difference between nominal and effective capacity in St. Kitts and Nevis can be up to 40% (i.e. *effective* capacity is 60% of nominal capacity).
- [27] U.S. Department of Energy - Energy Transitions Initiative, *St. Kitts & Nevis – Energy Snapshot* (2020). Estimate for the whole country.
- [28] Based on 2020 sales data provided by SKELEC and NEVLEC during the preparation of this PIF.
- [29] World Bank, *World Development Indicators – St. Kitts and Nevis* (2021) (available [on-line](#))
- [30] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015), p. 9
- [31] European Commission, *Annual action programme 2018 in favour of Saint Kitts and Nevis* (2018), p. 4.
- [32] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015) p.20.
- [33] IRENA, *Energy transformation: Latin America and the Caribbean* (2020), p.44.
- [34] U.S. Department of Energy, *St. Kitts & Nevis, Energy Snapshot* (2020), p.1
- [35] This [multi-donor project](#) is funded by the Inter-American Development Bank (IADB), the Green Climate Fund (GCF), the Japan International Cooperation Agency (JICA), the Department for International Development (DFID), the Clean Technology Fund (CTF), the Caribbean Development Bank (CDB) and the Global Environment Facility (GEF).
- [36] Ibid. p.6
- [37] U.S. Department of Energy, *Energy Snapshot: the Federation of Saint Christopher and Nevis* (2015)
- [38] European Commission, *Annual action programme 2018 in favour of Saint Kitts and Nevis* (2018)
- [39] Energy Report Card 2017: St. Kitts and Nevis
- [40] Developed through the GEF project 4171 – Energy for Sustainable Development in Caribbean Buildings.
- [41] Caribbean Renewable Energy Development Programme (CREDP/GIZ) 2014.

- [42] GFA Consulting Group GmbH, *Energy Audit Summary Report - Ministry of Public Infrastructure, Post, Urban Development and Transport, St. Kitts & Nevis & Caribbean Development Bank* (2019).
- [43] GFA Consulting Group GmbH, *Energy Audit Summary Report - Ministry of Public Infrastructure, Post, Urban Development and Transport, St. Kitts & Nevis & Caribbean Development Bank* (2019).
- [44] More specifically, the measures fall into one or more of the following categories (a) Lighting Measures, (b) Building Envelope Measures, (c) HVAC Measures, (d) Equipment & Plug Load Measures, (e) Pumping Measures, (f) Domestic Water Heating Measures, and (g) Renewable Energy Measures.
- [45] When households or businesses install private solar, they are most likely to also retain a connection to the grid, which means that the utility needs to maintain enough generation capacity to meet load when all these users come on-line. This requires oversizing the system's capacity, and, in the long-run, often shifts costs to those grid customers who can afford it less.
- [46] United for Efficiency, *St. Kitts and Nevis country assessment* (2019) p. 1-2
- [47] United for Efficiency, *St. Kitts and Nevis country assessment* (2019) p. 1
- [48] United for Efficiency, *St. Kitts and Nevis country assessment* (2019) p. 3
- [49] Currently the Ministry of Public Infrastructure, Posts, and Urban Development.
- [50] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015) p.23.
- [51] NEP 2011, p.9.
- [52] NEP 2014, p.3.
- [53] Inter-American Development Bank, *Challenges and opportunities for the energy sector in the Eastern Caribbean: Saint Kitts and Nevis energy dossier* (2015) p.25
- [54] St. Kitts and Nevis National Climate Change Policy – November 2017.
- [55] The Office of the High Representative for the Least Developed Countries, Landlocked Countries and Small Island Developing States, *Policy Brief #13: achieving SDG 7 in Small Island Developing States—mid-term review of the Samoa pathway* (2019), p.6.
- [56] Republic of the Marshall Islands, *Navigating our energy future: Marshall Islands 2018-2050 Electricity Roadmap*,(2018) p. 63.
- [57] Government of St. Kitt and Nevis, *Progress report on the implementation of the National Energy Policy* (2020) p.10
- [58] One such example is the Eastern Caribbean Central Bank, which is also expected to introduce energy efficiency measures for their facilities in Basseterre (St. Kitts.) with the view of achieving carbon neutrality by 2022.
- [59] While the current policy is deemed an energy policy, in practice it is more akin to an *electricity* policy. This project will cover the latter sub-sector. Convenience of separating the energy and the electricity policy will be assessed with the country during execution.
- [60] IRENA, *National energy roadmaps for islands* (2016)
- [61] Republic of the Marshall Islands, *Navigating our energy future: Marshall Islands 2018-2050 Electricity Roadmap* (2018)
- [62] IRENA, *Transforming small-island power systems technical planning studies for the integration of variable renewables* (2018). p. 32
- [63] The second one involves the preparation of bankable proposals and is the subject of output 3.1, discussed below.

[64] As of March 2021, for example, the Energy Unit in the Ministry of Public Infrastructure, Posts, and Urban Development consists of two staff members. In Nevis, the Energy Unit in the NIA consists of one single official.

[65] GFA Consulting Group GmbH, *Energy Audit Summary Report - Ministry of Public Infrastructure, Post, Urban Development and Transport, St. Kitts & Nevis & Caribbean Development Bank* (2019). A summary of these results is presented in the baseline section, Table 6.

[66] For the measures that are *not* implemented as part of this pilot, a full-fledged proposal will be prepared as part of output 3.1 for financing under available mechanisms.

[67] Refer to Table 6 in the baseline section.

[68] Laws, N., Anderson, K. et. al., *Impacts of valuing resilience on cost-optimal PV and storage systems for commercial buildings* (2018). *Renewable Energy* 127, pp. 896-909

[69] In the same philosophy as art. 5 of the EU Energy Efficiency Directive ([Directive 2012/27/EU](#)), which establishes an “exemplary role of public bodies’ buildings”.

[70] This follows OECD’s two-pronged understanding of additionality, which includes financial additionality (i.e. transactions extended to an entity which cannot obtain finance from the private capital markets (local or international) with similar terms or quantities and for similar purposes) as well as development additionality (i.e. the development impact of the investment that would not have occurred without a partnership between the official and the private sector). For an extended discussion on this refer to OECD, *OECD DAC Blended Finance Principle 2: Design blended finance to increase the mobilisation of commercial finance* (2020). Available [here](#).

[71] IADB, Funding Proposal [FP020: Sustainable Energy Facility for the Eastern Caribbean](#), table 2.

[72] IADB, [Request for CEO Endorsement for the GEF project 5312 “Sustainable Energy Facility \(SEF\) for the Eastern Caribbean”](#), p.1

[73] UNFCCC (2018), “Tool to calculate the emission factor for an electricity system”. CDM Executive Board 100 meeting.

[74] IRENA, *Global energy transformation: A roadmap to 2050* (2019). Available [here](#).

[75] U.S. Department of Energy, *St. Kitts & Nevis, Energy Snapshot* (2020)

[76] Potential candidates are discussed in the context of Component 2 of the proposed project.

[77] For more details on the pilots considered at this stage, please refer to the discussion on Component 2.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

1b. *Project Map and Coordinates.*

Please provide geo-referenced information and map where the project interventions will take place.

Figure 10. Map of St. Kitts and Nevis





Table 10. Coordinates

Location	Latitude	Longitude
Basseterre (Saint Kitts)	17.2948	-62.7261
Charlestown (Nevis)	17.1392	-62.6228

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities

Civil Society Organizations

Private Sector Entities

If none of the above, please explain why: Yes

This document has been prepared through extensive consultation with representatives of the Ministry of Sustainable Development, the Ministry of Public Infrastructure, Posts, and Urban Development, Ministry of Environment and Cooperatives, and representatives from the utilities (SKELEC and NEVLEC). In the project identification phase, key documents have been reviewed to develop this concept. These documents - the National Energy Policy, the National Climate Change Policy, and other key documents - have been developed through a participatory stakeholder approach. Thus, while the preparation of this PIF itself has not held consultations with all of the specific stakeholders engaged in the development of the documents mentioned above, their perceptions are taken into account as the outcome documents are reflective of the position of the stakeholders which informed the development of the PIF.

As a country of just over 50,000 people, St. Kitts and Nevis is extremely centralized. Local decision-makers have a close connection with the twin-islands' inhabitants. As a country of such size, civil society organizations are weakly coordinated and in the timeline for the PIF development were not able to be contacted. Similarly, the local private sector is small, with many activities centralized through the Government. Both groups will be involved comprehensively during full project preparation.

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement

Stakeholders from civil society (including women's associations) and the private sector (including financial and development institutions at the national and regional level) will be engaged and involved during project preparation through stakeholder workshops, consultation meetings and bilateral consultations. The process of project preparation will ensure that all different stakeholder groups are heard and contribute in a meaningful way. St. Kitts and Nevis has no indigenous peoples.

The following table summarizes the main stakeholders that will be engaged during the PPG phase.

Table 11. Preliminary list of stakeholders and means of engagement

Type of stakeholders	Indicative list	Roles and topics to be covered during PPG phase	Means of engagement
----------------------	-----------------	---	---------------------

Public	Ministry of Sustainable Development, Ministry of Public Infrastructure, Posts, and Urban Development, Ministry of Finance, Ministry of International Trade, Industry, Commerce and Consumer Affairs, Ministry of Social Development and Gender Affairs	Coordination and overall vision. Roles & responsibilities during the transition. Participation in training and capacity building. Technical, financial, fiscal, social, and environmental allocation of costs and benefits emerging from the transition. Gender issues.	The inception workshop will provide a general introduction of the project to the different stakeholders. Bilateral or multilateral meetings and thematic workshops will follow throughout project design according to the institution and their main interests, roles and responsibilities. Specific cooperation agreements will be established (e.g. in Memorandum of Understanding and Co-finance letters). Further engagement will be established during project execution, through the project's Multi-stakeholder consultation, engagement and communication strategy (output 3.3)
Development partners	World Bank, Inter-American Development Bank, OECD, European Union, Japan International Cooperation Agency (JICA), U.S. Agency for International Development (USAID), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Agence Française de Développement (AFD), and others;	Coordination of technical assistance, investments, and support. Engagement on the preparation of the roadmap and the business plan. Expected role during the transition. Identification of needs and gaps regarding country access to funds and support. Potential funding of the transition.	
Regional entities	CARICOM, Eastern Caribbean Central Bank (ECCB), Caribbean Development Bank (CDB), the Economic Commission for Latin America and the Caribbean (ECLAC), among others. Country Office in Saint Kitts and Nevis of the Organization of American States (OAS)	Coordination of technical and financial assistance. Alignment with regional projects and initiatives. Identification of needs, particularly to enable access to finance to RE and EE projects for small-to-medium enterprises in the country.	
Technical entities	International Renewable Energy Agency (IRENA), the Technical Assistance Program	Technical assistance and coordination with initiatives	

S	A), the Technical Assistance Programme for Sustainable Energy in the Caribbean (TAPSEC), the Caribbean Centre for Renewable Energy & Energy Efficiency (CCREEE), the Climate Technology Centre and Network (CTCN), among others	Coordination with initiatives in similar SIDS and in the Eastern Caribbean Region.	
Private sector and local entities	Development Bank of St. Kitts and Nevis, St Kitts- Nevis- Anguilla National Bank Limited, First Caribbean International Bank, Bank of Nevis; SKELEC, NEVLEC, Chamber of Industry and Commerce (SKNCIC), SKN Hotel & Tourism Association, WindWatt, Leclanché. The Clarence Fitzroy Bryant College and other national and regional education institutions.	Engagement in the preparation of the roadmap. Identification and assessment of needs and gaps. Identification of opportunities. Beneficiaries for training for the preparation and appraisal of bankable renewable energy and energy efficiency projects.	
Civil society	Caribbean Natural Resources Institute (CANARI), UNESCO, FAO, Department of Gender Affairs, National Advisory Council on Gender Equity and Equality	Social and environmental equity aspects emerging from the transition. Gender issues.	

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

Overview and current status

St. Kitts and Nevis has ratified a number of international and regional conventions and agreements that promote gender equality, including the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) 1979 which was ratified in 1985; the Inter-American Convention on the Prevention, Punishment and Eradication of Violence Against Women (Convention of 'Belem do Para') 1995; and among OECS Member States, the Treaty of Basseterre (1981) and the Revised Treaty of Basseterre (2010). SKN also upholds the following international and regional instruments: the Nairobi Forward-looking Strategies for the Advancement of Women (1985); the Beijing Declaration and Platform for Action (1995); the Millennium Development Goals (2000); the Commonwealth Plan of Action for Gender Equality (2005-2015); the OAS/CIM Strategic Plan of Action (2011-2016); and the Quito Consensus (2007).

The institutional arrangements in St. Kitts and Nevis to address gender issues include: (i) the Department of Gender Affairs, which was established in 1984 and was formerly known as the Bureau of Women's Affairs; (ii) a National Advisory Council on Gender Equity and Equality; and (iii) an Inter-Ministerial Committee of Gender Focal Points. The DGA is headed by a Permanent Secretary within the Ministry of Social Development and Gender Affairs. Civil society organizations are not actively engaged in advocacy on gender equality and women's empowerment in the country although gender-sensitive approaches are taken with regard to some issues. CSOs and NGOs in St. Kitts and Nevis are challenged due to their dependence on external funding for their operations. The Government has provided support and engaged in partnership for the development and implementation of the national gender mainstreaming agenda. The Government is currently undertaking the process to develop a National Gender Policy.

The most recent appraisals on gender issues include the Country Gender Assessment (CGA) of 2014 conducted by the Caribbean Development Bank and the 2013-2018 Country Report from the Federation of St. Christopher and Nevis on the twenty-fifth anniversary of the Fourth World Conference on Women and adoption of the Beijing Declaration and Platform for Action (issued in April 2019). The DGA is preparing to commence phase 2 of a UNESCO-funded National Gender Equality Policy and Action Plan (GEPAP). The GEPAP will provide the institutional framework to assist the Government in facilitating gender equality and empowerment through gender sensitive initiatives that incorporate a rights-based approach to human development.

In St. Kitts and Nevis, at the primary level, females have a higher completion rate at 32.5%, as compared to males at 24%. At the secondary level also, females have a slightly higher completion rate at 52.5% as compared to males at 51.6%. As reported in the CGA, in 2012, there were almost two times the number of females than males at the [Caribbean Secondary Education Certificate \(CSEC\)](#) level (807 females or 64%, compared to 455 males or 36%), and almost three times the number of female than male candidates (418 girls or 71%, compared to 167 boys or 29%) at the [Caribbean Advanced Proficiency Examination \(CAPE\)](#) level. Although females outperform their male counterparts at school and college level, men have a higher completion rate at university level (11%)[1].

Labor and employment are marked by women's lower participation in the formal work force and higher unemployment rates, with women occupying the lower paying sectors of the economy. Women are more likely to be unemployed and defined as "economically inactive". As reported in the CGA, women's unpaid reproductive work in the home (or 'care economy'), and their work in the informal economy and subsistence agriculture are not quantified or taken into account

in economic and social policy-making. Overall, the unemployment rate is higher for women than men, and women tend to remain unemployed for longer periods than men. There is therefore a pressing need for programmes and initiatives that aim to increase women's access to opportunities for employment, entrepreneurship and ownership, and thus empower them economically in key sectors such as agriculture and tourism.

It is estimated that some 80% males and 20% females occupy farm holdings and that there is a 70:30 ratio of males to females in actual production[2]. In addition, with the exception of the all-female Fahies Agriculture Women Cooperative Society, women's membership in cooperatives stands at 24%. While women dominate agro-processing in St. Kitts and Nevis, they face major barriers to expanding their involvement in agriculture, including domestic responsibilities, expertise, marketing, and access to Caribbean and other markets. In the tourism sector, the concentration of women is in the lower skilled, less stable 'domestic' side of the sector[3]. In SKN, gender bias underpins economic and social decision-making, which affects communities, families and households, and individual women's lives.

In terms of decision-making authority and power, women in SKN are under-represented in positions at all levels where they can sufficiently influence the power and decision-making process. This happens to be the case at the levels of parliament, the executive (central government), local government, and in Statutory Bodies. The Country Report to the twenty-fifth anniversary of the Fourth World Conference on Women and adoption of the Beijing Declaration and Platform for Action (April 2019) indicates that the percentage of women in politics is 20%[4]. However, in consultation with technical personnel within the Government of St. Kitts and Nevis it is estimated that as at 2021 women in politics is estimated between 35%-38%.

Project Activities to promote Gender Equity

The Global Environment Facility (GEF) and the UN Environment Programme (UNEP) have made strong commitments to gender-responsive approaches throughout their work, and it is therefore highly important that this project aligns to these mandates. The project will thus follow the GEF Policy on Gender Mainstreaming and [UNEP's Gender Policy](#).

The approach to gender in this project will be based on the UN's [Women Empowerment Principles](#), and aligned with the National Gender Policy and Action Plan[5]. The approach proposed consists of two main elements. A **Gender Action Plan** will be developed to assess each of the project's outputs and interventions, identifying risks, opportunities, and concrete measures in the context of each of the proposed project's interventions. The Gender Action Plan will likewise include indicators and targets, as well as responsibilities, budget, and timelines for its implementation. It will allow the project to engage gender issues in terms of its own activities, trainings, governance structure and recommendations. This plan will be developed in the PPG phase and will guide gender considerations during project implementation.

The second element is the development of a **Gender Strategy** for the implementation of the NEP and its roadmap. The underlying idea is that the revised NEP is endowed with enough resolution to capture and confront gender inequalities in access to energy (in particular, renewables) and benefits derived from energy efficiency improvements. The scope of the Gender Strategy will cover three main areas: i) energy access through a gender lens, ii) gender inequalities in the energy sector workforce and iii) gender gaps in energy decision-making, providing a quantified baseline and concrete actions, indicators, targets and timelines towards the reduction of these gaps. The knowledge management system (output 1.5) will serve to keep track of the evolution of the indicators required to monitor progress on the implementation of the roadmap, including its gender aspects. The Gender Strategy will be developed during project execution.

Table 12. Proposed gender approach for this project

Element	Preparation	Execution	Scope
Gender Action Plan	PPG phase	Project implementation	Output-by-output assessment on gender considerations, identifying risks, opportunities, mitigation measures, responsibilities within the project team, timelines, indicators, and targets. Gender aspects will also be taken into account in the multi-stakeholder consultation, engagement and communication strategy (output 3.3.), by formulating messages that convey the gender responsive nature of the NEP and the 100% renewable energy roadmap.
Gender Strategy	Execution phase (included as part of output 1.1).	Roadmap implementation	Refined gender analysis and recommended actions (with timelines, responsibilities, required budget) to ensure that the NEP is a gender-responsive policy. Three main areas to include: i) energy access through a gender lens, ii) gender inequalities in the energy sector workforce and iii) gender gaps in energy decision-making.

[1] Caribbean Development Bank, *Country Gender Assessment, St. Kitts and Nevis Vol.1* (2014), p. 24

[2] Ibid. p. 14

[3] Ibid. p. 15

[4] Government of Saint Christopher and Nevis, *Country Report to the twenty-fifth anniversary of the Fourth World Conference on Women and adoption of the Beijing Declaration and Platform for Action* (2019), p. 41

[5] In the process of finalizing at the time of writing this PIF.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources; Yes

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

This project will create several entry points for the private sector. Most importantly, the roadmap and its associated investment plan (output 1.2) will provide a clear path for the development of the entire electricity sector, thus bringing long-term certainty on the type of investments that will be required and when. This will provide a clear signal to the private sector, reducing uncertainty and risk. Engagement of the private sector will be crucial to ensure that the roadmap is put in practice, as the flow of investments associated with it will surely exceed public funds available in the country.

Output 3.2 (blended financing mechanism) will provide an innovative financial mechanism aimed at facilitating deployment of public and private investments that respond to the specific small island developing state context of St. Kitts and Nevis (i.e. small market, located far from developed supply chains, small size of the local private sector, etc.). It will provide funds for micro, small and medium-sized enterprises for their implementation of additional energy efficiency measures, further driving down demand and materializing savings. Specific modalities will be explored during the design phase of the project. The implementation of the pilot (output 2.1.) will also have a strong demonstrative effect with private actors from the tourism and hotel sector.

Lastly, the communication campaign (output 3.3) will be essential for the country to show its progress and the extent of its ambition. A wide range of private sector actors -from banks to regional IPPs and potential local suppliers- will be the main targets for this campaign.

5. Risks to Achieving Project Objectives

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

A preliminary risk screening is presented below. These risks (and their potential mitigation measures) will be further evaluated during the project preparation grant phase.

Table 13. Project risks (preliminary)[1]

Category	Risk	Probability (P) & potential impact (I)	Mitigation measures
Social, Environmental, Political and Financial	COVID-19 uncertainty	P: Medium I: Medium	<p>Risks related to the pandemic have two components. The first is the one related to the restriction of circulation, which would affect mainly meetings for gathering data as well as workshops and related capacity building activities. This aspect of the risk would be mitigated mostly through remote work, on which the Ministry of Sustainable Development has had successful experiences during the initial outbreak.</p> <p>The second component is related to procurement processes, which can be paralyzed or slowed down depending on the evolution of the pandemic. In this context, at the beginning of project execution, the project timeline and dates of execution of all project activities will be re-evaluated taking into consideration any ongoing risks due to COVID-19. Moreover, the business model to be provided as output 1.2. will address this risk beyond the duration of the GEF project.</p>
Social, financial	Consumers perceiving a risk of higher energy prices resulting from a renewable based electricity grid may create opposition to the project	P: Medium I: Medium	<p>Studies conducted on comparable islands concluded that a competitive price (compared to the one resulting from a diesel-based grid) was feasible in a small, renewable-based grid[2]. Moreover, the price resulting from a renewable energy grid would suffer less volatility</p>

	transition to the project		<p>Global Environment Facility (GEF) Operations</p> <p>From a renewable energy grid would suffer less volatility as one dependent on oil. These results would be further strengthened by the introduction of a carbon price into the calculation of diesel costs.</p> <p>The communication strategy and the engagement of all stakeholders will be the main mitigation measures to ensure that misconceptions about renewable energies do not overtake public discourse. Moreover, the impact on the price will be carefully assessed as part of the roadmap and its different scenarios, allowing to anticipate any sharp movements in end-user costs (including any income distribution implications) and to recommend fiscal policies required to address the m.</p>
Political	Political opposition to the transition to a 100% renewable-powered grid.	P: Low I: Low	In a similar manner as in the previous risk, public concerns may arise around the resilience and reliability of a renewable based grid. The roadmap intends to set a pathway that increases the overall resilience of the system, which is why any proposed changes will be introduced gradually over a long term and only after the grid has been deemed capable of absorbing any resulting changes in technology. The communication strategy (output 3.3.) is intended precisely to engage the public and ensure they have a precise understanding of what is being proposed by the project, how, and when.
Extreme events and climate change risk	Damage in infrastructure resulting from an extreme weather event	P: Medium I: High	Owing to its location, the Federation of St Kitts and Nevis is extremely exposed to the effects of tropical storms and hurricanes. While there is still some uncertainty about the direction of change in the <i>frequency</i> of these events in a changing climate, some studies project an increase in hurricane <i>intensity</i> [3]. Likewise, the greatest risk for flooding and landslides comes from periods of heavy rain associated with events such as hurricanes and tropical storms.

			<p>While most part of the work under this project involves the drafting of policies, plans, business models and a roadmap, two pilots comprised of energy efficiency measures is expected to be undertaken in each island (output 2.2). This risk will need to be thoroughly assessed during the design phase, once the specific pilots are designed, to ensure that measures to minimize the likelihood of damage are in place.</p>
	Climate change related events affects implementation of project activities with identified stakeholders.	P: Low I: Low	<p>The recent experience with the COVID pandemic has resulted in a great deal of flexibility in terms of shifting face-to-face activities to a virtual modality with relatively short anticipation. As a default, all communications, training and stakeholder engagement activities will be designed under two modalities (i.e. in-person and virtual) and the project team will be ready to switch between the two depending on the circumstances. This same approach will be followed in case of extreme events affecting the implementation of any project activities that involve external stakeholders, from workshops to training to communication seminars.</p>
Institutional	National institutions not having sufficient capacities to collaborate with the project	P: Low I: Medium	<p>Developing capacities is at the very core of this project, with output 1.6 dedicated fully towards the strengthening of different needs identified by the country. Moreover, the project will build upon other capacity building activities undertaken by other parties, such as those to be implemented by the European Union through its National Indicative Programme and technical assistance provided by CDB. Lastly, the roadmap will also include a section on human resources, identifying the requirements needed through each stage of its implementation, as well as capacity gaps that need to be addressed, when, by whom and at which cost.</p>
Knowledge	Lack of information required for the roadmap	P: Medium I: Medium	<p>Information is a key input for the development of the roadmap. This risk will be tackled by output 1.5, which will ensure that information needed for decision making (and for the own tracking of the project) is readily available.</p>

			y available.
Commitment	Political will and government's priorities may change over time and the project may not be able to mobilize necessary resources and commitments including co-financing	P: Low I: Low	St. Kitts and Nevis has a strong commitment towards the reduction of GHG and intends to achieve emission reductions even on top of its NDC. By updating the NEP, developing a technically (and socially) feasible roadmap, and through the alleviation of the other barriers in the problem tree (Figure 2), the project is expected to mitigate this risk.
Operational	There are technical and financial risks of during O&M of pilot projects under Component 2 along with disaster risks described under climate change	P: Medium I: Low	During the first year of operation, the project will prepare a detailed design study that will include contingency plans for the operation of the pilots. Training of plant operators will further mitigate this risk.
Environmental	Environmental impacts (including air and water pollution, waste and GHG emissions) by transportation of goods and construction and decommissioning of facilities through the pilot projects and policy development for renewable energy and energy efficiency	P: Low I: Low	The pilots involved in this project are microscale, and therefore any environmental impact would be low. Nonetheless, the contingency plan in the design studies for the pilot will also cover environmental risks.
Low participation	There are risks that the private sector entities including SMEs and financial institutions will not be engaged as expected	P: Low I: Low	The project will allocate funds for a communication and engagement campaign that will run throughout the entire duration of the project as a mitigation measure for this specific risk.

Additional information related to the climate risk assessment

Following IPCC (2012)^[4], **hazard** is defined as the potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources. **Exposure** is employed to refer to the presence (location) of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets in places in which hazard events may occur. **Vulnerability** is defined as the propensity or predisposition to be adversely affected, and it encompasses a variety of

concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. In the context of the assessment of climate impacts, **risk** results from the interaction of vulnerability (of the affected system), the likelihood of the occurrence of a climate related hazard, and exposure to the latter.

This section presents a preliminary climate risks analysis in the context of a) the duration of the project and its activities, but also (and more importantly) in the context of b) the transition towards a green electricity grid that is envisaged as its ultimate objective. A more detailed assessment of climate risk and a management plan for the amelioration of those risks will be prepared together with the full project proposal.

The twin island Federation of St. Kitts and Nevis is a state composed of two islands of the Lesser Antilles in the Eastern Caribbean Sea, with a combined area of 260 km². The capital of St Kitts is Basseterre and the capital of Nevis is Charlestown. According to data from the 2011 census the population of the Federation of St. Kitts and Nevis is 53,192 (around 75% in St. Kitts and 25% in Nevis).

The major urban areas are Basseterre and Charlestown, the respective capitals of each island. In St. Kitts, while the population is concentrated in capital and surrounding suburban areas, a considerable portion of the population is located in coastal areas, with many villages located along coastal roads. Nevis follows a similar pattern to St. Kitts with the population being concentrated in and around Charlestown. Many of the villages in Nevis are located along the island's main road, which mirror the coast of the island. After years depending on the sugar industry, the tourism industry is now the main economic activity in St. Kitts and Nevis. The direct contribution of travel & tourism to GDP in St. Kitts and Nevis was around 10% of total GDP in 2019.^[5]

The location of the population centers on the coast enhances the vulnerability of St. Kitts and Nevis to the impacts of climate change. St. Kitts and Nevis is most vulnerable to cyclones and hurricanes (and the resulting storm surge), floods, and droughts. The country lies on the southern edge of the Atlantic hurricane belt where tropical cyclones occur throughout August, September, and October. Climate change has the potential to result in changes in hurricane frequency and intensity which will have countrywide social and economic implications. Some of the major hurricanes that have affected St. Kitts include Hurricane Hugo (1989), Hurricanes Luis and Marilyn (1995), Hurricane Georges (1998), Hurricane Omar (2008), Hurricane Earl (2010) Tropical Storm Emily (2011), Tropical Storm Rafael (2012) and Tropical Storm Gonzalo (2014). Generally, it is projected that St. Kitts and Nevis will experience: an increase in average atmospheric temperature; reduced average annual rainfall; increased Sea

Surface Temperatures (SST); and the potential for an increase in the intensity of tropical storms.^[6] As a SIDS, St. Kitts and Nevis is particularly vulnerable to the adverse impacts arising from these effects; of particular concern are the projected rates and consequences of sea level rise in a country whose principal settlements, economic and social infrastructure and the majority of its livelihood support systems are located within or near low-lying coastal areas.^[7] Specific areas that are likely to be impacted on include forests, coastal ecosystems, water resources, infrastructure, human settlements, agriculture, and one of the country's main source of income: tourism.

(i) How will the project's objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately?

The outputs in this project involve mostly desk work, e.g. the update of the NEP and the preparation of a roadmap, the knowledge managements system and the various capacity building activities. Potential climate-related effects that may play a role during execution include disruptions in data collection/data storage and difficulties to undertake capacity building activities. Hence, the design phase will choose the location and the timing of the activities in a way that reduces vulnerability; and the knowledge manage system will incorporate best practices to enhance its resilience.

More importantly, the pilots in output 2.1 will have to incorporate design and mitigation measures against extreme events (e.g. by considering a 50-year-return period for hurricanes in its design), increasing not just their own resilience but also that of the grid. This way, the pilot would also allow assessing (and preparing measures against) the risks faced by the country through the energy transition. These elements will be further discussed once the specific design of the pilots is decided upon.

In particular, the project's approach towards climate risks will be tackled in different manners throughout its lifetime. The following actions are planned for the design and the execution phase:

Table 14. Proposed approach towards climate risks during project design and execution

Design phase	Execution phase
<ul style="list-style-type: none"> - Information on how the targeted project components (e.g., the pilots, the capacity building activities) could be impacted by extreme events during project execution, and the level of severity. 	<ul style="list-style-type: none"> - Assessment on how different levels of projected climate change impacts, including climate variability, in the project location can affect the pathways established in the roadmap
<ul style="list-style-type: none"> - Information on how the proposed interventions may contribute to reducing the vulnerability to climate risks 	<ul style="list-style-type: none"> - Assessment of the effect of the proposed pathways to decarbonization of the grid on climate vulnerability and adaptation, and measures for preventing potential risks.
<ul style="list-style-type: none"> - Preparation of a monitoring plan for the execution phase that indicates what needs to be measured, when, and by whom – specially in relation to the project’s pilot (i.e. definition of a concrete research question) 	<ul style="list-style-type: none"> - Preparation of a post-project monitoring plan and contingency plan to track and mitigate risks during the energy transition that is to be set in motion by the project

(ii) Has the sensitivity to climate change, and its impacts, been assessed?

The following table summarizes the range of future scenarios presented in St. Kitts and Nevis’ Second National Communication to the UNFCCC:

Table 15. Expected impacts according to climate change projections for St. Kitts and Nevis^[8]

 Texto Descripción generada automáticamente

These scenarios will inform the pathways that result from the roadmap to decarbonization that is to be obtained as part of the project, evaluating sensitivity and capacity to cope and adapt (“adaptive capacity”) as the main components of vulnerability. Moreover, the possibility of concrete extreme events during project execution will be factored in during the project design.

(iii) Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with?

Resilience measures and practices will be established at two levels:

- at the level of **outputs and activities**, to establish mitigation measures in the event of extreme events during project execution. This will be defined during project design.
- at the **outcome** level, to assess possible interactions between the different climate projections and the proposed decarbonization pathways, and to establish a post-project monitoring and contingency plan to track and mitigate risks during the energy transition that is to be set in motion by the project. This will be defined during project execution, and is to be included as actual deliverables in output 1.2.

(iv) What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?

Actual execution of the project will take place during a relatively short timeframe (i.e. three years); hence, the main relevant risk during execution will be related to extreme events. These will be assessed during the PPG phase, once the details of the project are further defined. Mitigation measures will include remote alternatives for capacity building activities, cloud-based solutions and systematic backups of relevant information in the knowledge management system, as well as detailed specifications for the infrastructure that will be commissioned as part of the project.

Long-term effects of climate change, on the other hand, will be of major relevance for the assessment of possible decarbonization pathways for the electricity grid. The possible interactions between climate projections and the pathways proposed in the roadmap for the implementation of the NEP will be assessed as part of the project outputs. In particular, the project will assess the effect that the pathways proposed for the grid will have on climate vulnerability and adaptation (e.g. in terms of the vulnerability and resilience of the infrastructure in the power sector), and define specific measures for preventing potential risks.

COVID-19 risk and opportunities

-
As at July 18, 2021 the country recorded a total of 550 COVID-19 cases which included 483 recoveries and three (3) deaths.[9]

Risk

Ways in which the COVID-19 pandemic can potentially affect the project are listed below:

- Lockdown and movement restrictions: mobility restrictions and the need for social distancing due to the pandemic could lead to reduced possibility for activities that have traditionally required in-person participation, such as workshops, meetings, trainings and consultations.
- Slowdown of procurement processes, i.e. procurement processes can be paralyzed or slowed down depending on the evolution of the pandemic and the offices it affects.
- Staff turn-over due to the illness: long leave periods to recover from the symptoms can cause delays in the execution of project activities.

Mitigation measures

Prompt government action helped to contain the pandemic's public health impact. At the onset of the pandemic in March 2020, the government swiftly restricted inbound travel, introduced safety protocols including a month-long national lockdown, and procured protective and medical equipment. In July 2021 the Government has established new flexibilization measures that implied a gradual reopening of the economy, returning to a normal activity, due to a decline in confirmed cases. The latest measures include[10]:

- A night curfew from 9:00 pm to 5:00 am daily.
- Buses are allowed a maximum capacity of 10 passengers.
- Inter-island travel between St. Kitts and Nevis is resumed.
- Churches can resume normal services.
- Nurseries and daycare centers can reopen.
- Bars and restaurants can resume normal activity, operating with full COVID-19 protocols.

- Social gatherings will be permitted but organizers must first apply for permission from the Commissioner of Police, and beaches will be open for exercise only. No beach parties or mass gatherings will be permitted.
- Quarantine for incoming fully vaccinated passengers will be reduced from 9 days to 3 days with testing on the 4th day and release once the test is negative.
- Quarantine remains at 14 days for unvaccinated returning citizens and residents.

Due to the changing nature of the pandemic, a dynamic approach will be pursued to accommodate to various contingent scenarios:

- In the event of mobility restrictions and the need for social distancing, alternative and innovate forms of meeting organization and communication will be implemented (i.e. using online platforms). The impacts of the pandemic in 2020 have meant that such technologies are already becoming commonplace and acceptable for usage by a broad range of stakeholders.
- As for the procurement risk, at the beginning of project execution the project timeline and dates of execution of all project activities will be re-evaluated taking into consideration any on-going risks due to COVID-19.
- The entity acting as Executing Agency will cross-train staff so that if a worker contracts COVID-19 and is on leave during their recovery, the project can continue.
- Regarding the country's priorities, the pandemic is likely to underline the importance of having monitoring and evaluation systems for climate action.

Opportunities

St. Kitts and Nevis entered the Covid-19 pandemic from a position of fiscal strength following nearly a decade of budget surpluses. A significant part of the large CBI revenues were prudently saved, reducing public debt to below the regional debt target of 60 percent of GDP and supporting accumulation of large government deposits. The subsequent reopening of borders has been accompanied by strict safety protocols. The [response measures effectively mitigated the pandemic's human cost](#) with St. Kitts and Nevis having had the lowest per capita case count in the Western Hemisphere. However, as a tourism-dependent country, the economy of St. Kitts and Nevis was heavily affected by the pandemic.

As of July 2021, the borders and the economy are gradually reopening. In this way, a rebound in tourist activity should be a boost for a strong recovery during 2022, and the International Monetary Fund (IMF) expects a 10% increase for said year, with the country reaching a pre-pandemic GDP in 2024. [11] This rebound could provide a good opportunity for the Island to introduce reforms that might help boost productivity growth, including the kick start for a transition towards a cleaner energy matrix.

[1] COVID-19 and climate change risks are further assessed below this table.

[2] The Republic of the Marshall Islands conducted a similar study to evaluate a transition to 100% renewables for its electricity grid, concluding that up to a 65% reduction in the grid's GHG emissions could be achieved with a levelized cost of electricity equivalent to the one that the system is currently paying for a 100% fossil fueled grid in a period of 12 years. While after these 12 years the price would increase, the authors conclude that by then a reduction in the cost of renewables and storage is very likely to drive the LCOE further down, considering the trends and developments in these technologies. This is discussed in *Navigating our energy future: Marshall Islands 2018-2050 Electricity Roadmap*,(2018) p. 39. Study available [here](#).

[3] Second National Communication (2015)

[4] IPCC, 2012: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

[5] Statista, *Travel and tourism sector as percentage of gross domestic product in Saint Kitts and Nevis from 2010 to 2019*. [Data](#) accessed on 17/07/2021.

[6] Government of St. Kitts and Nevis, *National Climate Change Policy* (2017), p.9.

[7] Government of St. Kitts and Nevis, *Second National Communications Report under the United Nations Framework Convention on Climate Change* (2015), p.36.

[8] Government of St. Kitts and Nevis, *National Climate Change Policy* (2017), p.10.

[9] covid19.gov.kn/2021/07/18/st-kitts-nevis-covid-19-situation-report-no-478/

[10] covid19.gov.kn, *St. Kitts and Nevis moves to a near full reopening of the economy with significant easing of restrictions*. [Article](#) accessed on 19/07/2021.

[11] IMF, *St. Kitts and Nevis: Staff Concluding Statement of the 2021 Article IV Mission*. [Article](#) accessed on 19/07/2021.

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

Institutional arrangements

The preliminary institutional structure for the project is as depicted in Figure 11. The Ministry of Sustainable Development will be the Executing Agency, in charge of execution of the project's day-to-day activities. UNEP will act as the GEF implementing agency, providing overall supervision and guidance. UNEP's comparative advantage for this project lays mainly in i) its past experiences in similar GEF projects in the region (see e.g. GEF project 4171 - "Energy for Sustainable Development in Caribbean Buildings"); ii) UNEP's involvement in on-going GEF projects in the country (e.g. the 4th Technology Needs Assessment), which will facilitate coordination; and iii) regional presence through its Caribbean Sub-Regional Office. If deemed beneficial for the project, an organization providing execution support will be identified in the CEO Endorsement request preparation phase.

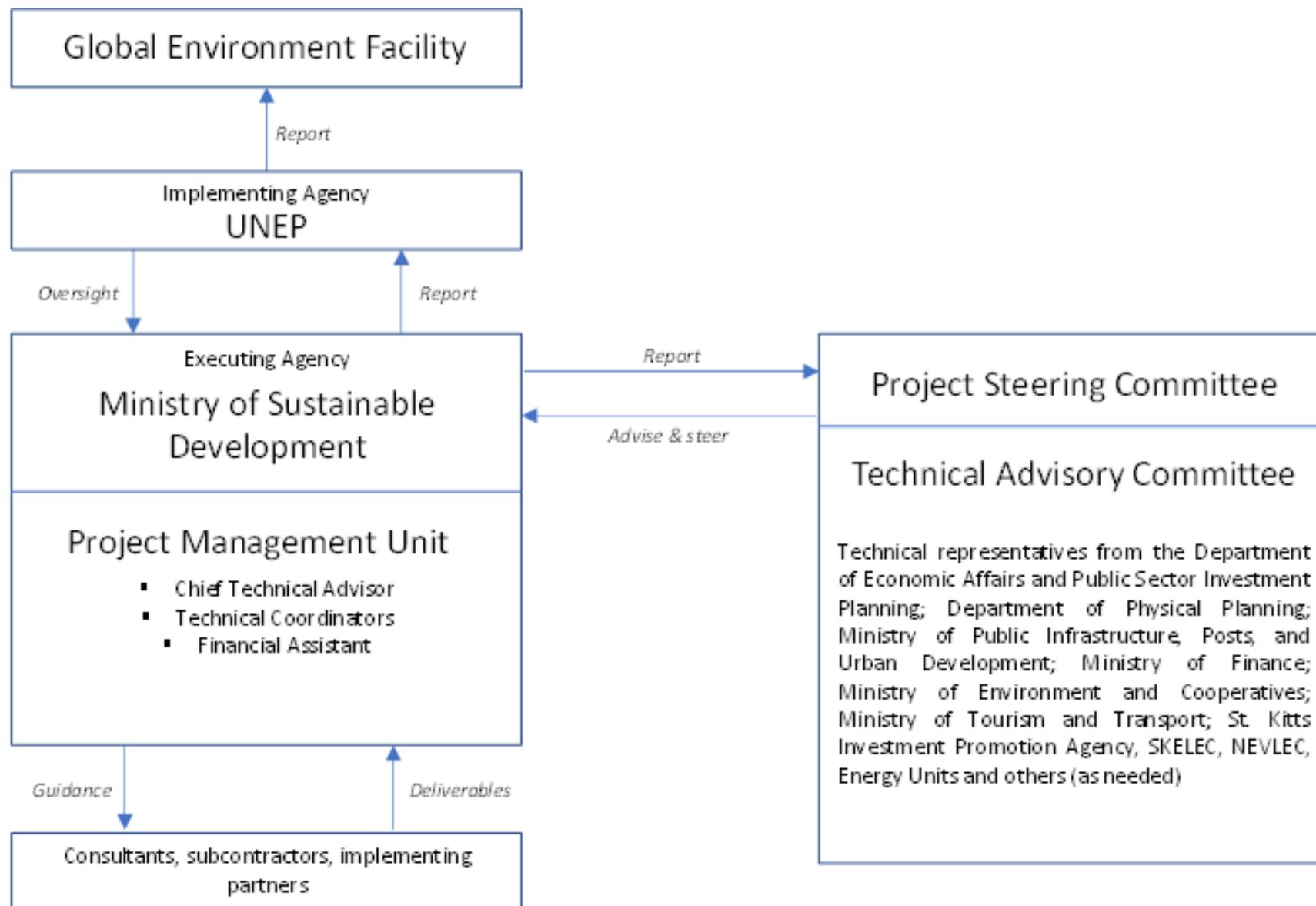
The main project bodies are the following:

The **Project Management Unit (PMU)** is the management framework within the Ministry of Sustainable Development, whose core structure consists of a Chief Technical Advisor and technical coordinators with specialized expertise hired to work on specific components. The PMU is designed to achieve efficiency and coordination in the management of the project activities and actors, ensuring that there is effective coordination and efficiency with other on-going initiatives. Saint Kitts and Nevis is a small island developing state where access to well-trained technical capacity is a key risk. The PMU is a mitigation measure to minimize this risk.

The **Project Steering Committee (PSC)** is a high-level cross-sectorial committee comprising key Permanent Secretaries and other heads of institutions where relevant to provide approval of recommendations presented by the Technical Advisory Committee (TAC). This body will include the Ministry of Sustainable Development, the Ministry of Public Infrastructure, Posts and Urban Development, Ministry of Finance, Ministry of Communications, Works et. al, Office of the Premier, Ministry of Environment and Cooperatives, Ministry of Tourism and Transport and other high-level personnel as deemed appropriate.

The **Technical Advisory Committee (TAC)** It will include technical representatives from the Department of Economic Affairs and Public Sector Investment Planning; Department of Physical Planning; Ministry of Public Infrastructure, Posts, and Urban Development; Ministry of Finance; Ministry of Environment and Cooperatives; Ministry of Tourism and Transport; St. Kitts Investment Promotion Agency, SKELEC, NEVLEC (the utilities in the island of Saint Kitts and the island of Nevis, respectively), Energy Units and other technical personnel and members of civil society as deemed appropriate.

Figure 11. Proposed implementation arrangements



Coordination with other initiatives

The UN Resident Coordinator (RC) for Barbados and the Eastern Caribbean^[1] will be involved in the project design phase, along with the country coordinator officer based in St. Kitts and Nevis and UNEP's sub-regional office for the Caribbean. The proposed project is ambitious as it intends to set the country on a path that would fundamentally transform its electricity grid. This fact places the project in the center of any on-going initiative that is relevant for the energy sector. The following table revisits Table 7 from the baseline section, adding a brief discussion in the last column to reflect how the proposed project intends to take advantage of any potential synergies arising from coordination of efforts.

Table 16. Coordination with on-going initiatives

Project	Objectives and relevance to this project	Intended coordination and synergies
NDC enhancement and implementation IRENA, UNDP, NDC Partnership; 2021. Budget: n.a.	Activities include: the development of an energy management methodology for greenhouse gas emissions (GHGs); target tracking; roadmaps for the electrification of the transport sector; roadmaps for emerging technologies, such as green hydrogen and ocean energy; rooftop solar simulation; energy monitoring, reporting and verification (MRV); mitigation scenarios; project facilitation; and access to finance.	The roadmap and the revised NEP are key for the NDC and have to be aligned. The NDC implementation time frame is 2020-2030, with a mid-term revision expected in 2025. This revision would therefore be anchored in the technical assessment resulting from the roadmap and the ambition laid out in the revised NEP.
GEF Technology Needs Assessment (TNA) (IV), GEF ID 10171 UNEP DTU Partnership. 2020 – 2023, USD 270,000 (GEF)	Update its 2006 TNA as well as to create Technology Action Plans.	A draft of the TNA is expected for 2022, so it will be an important input for the proposed project.
Improving Environmental Management through Sustainable Land Management	To transform degraded forest landscapes into biodiversity and climate-friendly areas of sustainable agricultural / agroforestry production.	Adoption of building codes will have an important impact in terms of energy efficiency. This GEF-6 activity will inform the proposed project,

<p>ment in St. Kitts and Nevis, GEF ID 9785 (GEF-6)</p> <p>UNEP, IUCN</p> <p>2018 – 2023;</p> <p>USD 3,015,982</p>	<p>This project foresees the updating of St. Kitts National Physical Development Plan (NPDP) and the National Building Code; the Nevis Island Administration recently completed the update of the Nevis Physical Development Plan.</p>	<p>as the latter would be starting execution by the time the former is closing technical implementation.</p>
<p>Energy and Energy Efficiency Sector Budget Support</p> <p>11th European Development Fund</p> <p>2018 – 2022</p> <p>EUR 5,200,000</p>	<p>To support St. Kitts and Nevis to establish a sustainable energy sector based on local renewable energy sources by increasing integration of the renewable energy and energy efficiency in public facilities.</p>	<p>Among other targets, EU funds will be used to strengthen the energy units and finance capacity building activities. Training activities to be proposed by the GEF-7 project will build upon the efforts of the EU partnership.</p> <p>The strengthening of the Energy Unit will allow for the Government to enhance institutional capacity in terms of identifying the conditions necessary to provide an enabling environment for the Sector. The Energy Unit will also provide advice and assist the government in reviewing the National Energy Policy which sets the framework for the Energy Sector.</p>
<p>Sustainable Energy Facility for the Eastern Caribbean</p> <p>GEF, GCF, JICA, IDB 2017 – 2025</p> <p>USD 23,900,000</p>	<p>Seeks to address the financial, technical, and institutional barriers faced by geothermal energy and to provide institutional strengthening.</p>	<p>This project focuses on geothermal energies, which is a fundamental source for St. Kitts and Nevis. Although the proposed GEF-7 project will be more oriented towards an integrated resource roadmap that considers all types of renewables (and their interaction with diesel generators in the initial phases of the transition), the roadmap will integrate the findings from the Sustainable Energy Facility and integrate them into their technical scenarios. Any additional work on sectorial policy and/or legislation will be coordinated between both projects, which should be facilitated by the fact that both advanced</p>

		e the policy direction of the Ministry of Public Infrastructure, Posts, and Urban Development.
<p>GEEREF NeXt (GCF FP038)</p> <p>EIB, 2017 - 2023</p> <p>USD 265,000,000 (total GCF grant + equity for 35 countries in Eastern Europe, Latin America and the Caribbean)</p>	<p>GEEREF NeXt is designed to catalyze private sector capital at scale for the development of RE/EE projects across the GCF eligible countries, as well as to build capacity at the local level and contribute to the necessary transfer of knowledge and technology, to support the evolution of the commercial environments and enabling ecosystems for clean energy in these countries.</p>	<p>Coordination between this project and output 3.2 (blended financial mechanism) will be established during the PPG phase in order not to duplicate efforts.</p>
<p>Building Resiliency in the Water Supply Sector in St. Kitts and Nevis</p> <p>GCF;</p> <p>2022 - 2027</p> <p>USD 38,300,000</p>	<p>The proposed project (currently at concept note stages) seeks to increase climate resilience and sustainability for the water supply sector in SKN. It is expected to develop a 7 MW renewable power plant to provide electricity to a water desalination plant, selling surplus to the electric grid.</p>	<p>This GCF project is likely to enter after the proposed GEF-7 project has started execution. While the former is more focused on water desalination, the nexus between water and energy is of utmost importance for St. Kitts and Nevis as water potabilization is one of the main consumers of energy. Moreover, the GCF project intends to build a renewable power plant that is intended to feed back into the power grid, an element upon which the GEF-7 project will bring clarity. It is important to note that the scope of the project is under review as a result of feedback received from the GCF in 2020.</p>
<p>Sustainable Energy Facility (SEF) for the Eastern Caribbean (GEF-5)</p> <p>GEF, IADB, CDB</p> <p>2016 – 2021;</p> <p>USD 3,013,698 (total grant for the entire region)</p>	<p>Reduce the dependency on fossil fuels by promoting the implementation of energy efficiency measures and renewable energy projects and solutions, including geothermal energy projects, as a way to reduce fossil fuel consumption and costs. This project has financed a series of energy audits in public buildings that are referred to throughout this proposal.</p>	<p>The audits funded by the SEF have already been completed and include measures in terms of energy efficiency but also in terms of micro-scale power generation. These results will inform the pilots that will be designed during the PPG phase of the GEF-7 project. The GEF-7 project also aims to implement the measures identified in the energy audits based on further guidance of technical personnel.</p>
<p>CDB storage</p>	<p>Grant to assist utilities and relevant stakeholders</p>	<p>Energy storage will be a critical technological i</p>

<p>2018 – on-going USD 350,000 (region)</p>	<p>ers across the region to develop, plan and design energy storage and grid modernization solutions, which could accelerate the Caribbean’s shift to clean energy.</p>	<p>input for the stabilization of the grid under the presence of variable renewable energies. Any studies resulting from the CDB funds will be available for consideration by the proposed GEF-7 project.</p>
<p>CDB Street and Flood Light GSKN 2018 – 2021; USD 5,792,000</p>	<p>GSKN requested financing from CDB to replace all of its High-Pressure Sodium (HPS) and Mercury Vapour (MV) street lights with high efficiency LED systems.</p>	<p>These measures will reduce energy consumption and are likely to have a demonstrative effect. The GEF-7 project will build upon the lessons learnt by the CDB lights replacement project.</p>
<p>35.7 MW solar photovoltaic system (solar field) and a 14.8 MW / 45.7 MWh lithium-ion battery energy storage system (BESS) Leclanché SA 2018 – on-going USD 70,000,000</p>	<p>First of its kind in St. Kitts and Nevis. Commissioning announced for 2022</p>	<p>Lessons learned during the construction phase of the solar PV system will be a key input for the roadmap resulting from the proposed GEF-7 project. Opportunities for cooperation and coordination will also be pursued during the initial months of operation of the PV power plant, when the recommendations for the integration of renewables with the grid are being drafted.</p>
<p>National Gender Equality Policy and Action Plan (GEPAP)</p>	<p>The objective of the GEPAP is to facilitate research on gender issues to generate information for dissemination, and to allow for data collection, analyses, interpretation, dissemination and use regarding intentional injuries.</p>	<p>The Department of Gender Affairs (DGA) is preparing to commence phase 2 of a UNESCO-funded National Gender Equality Policy and Action Plan (GEPAP). The project recommendations in terms of gender will be aligned to the GEPAP, and for this purpose the project management unit will coordinate with the DGA.</p>
<p>Public Procurement Reform in the Eastern Caribbean Project (regional). Caribbean Development Bank (CDB). 2018 – on-going USD 700,000</p>	<p>This project aims at assisting with the establishment of modern procurement systems in the Organization of Eastern Caribbean States (OECES). Procurement processes that arise from this project will be applicable during the energy transition to renewables that will take place as a result of the proposal described on this PIF.</p>	<p>The procurement reform will further contribute to creating the enabling conditions needed to accelerate the introduction of renewable energies in the country.</p>

[1] As the highest-ranking representative of the Secretary-General at the regional level, the Resident Coordinator leads the UN Sub-Regional Team for Barbados and the Eastern Caribbean, comprising Heads of Agencies of 20 Agencies, Funds and Programmes, to “deliver as one” on the 2030 Agenda for Sustainable Development for all.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions?

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

- UNFCCC intended nationally determined contribution. The project is aligned with St. Kitts and Nevis's intended Nationally Determined Commitment (iNDC of 12th December 2015) to the UNFCCC, through which the country notes that the energy and transport sectors are the primary sources of GHG emissions. St Kitts and Nevis has committed to a 22% reduction of the absolute GHG from the Business as Usual (BAU) scenario in 2025, and a 35% reduction of the absolute GHG from the BAU scenario in 2030.^[1]
- UNFCCC national communication. The project is also consistent with St. Kitts and Nevis's second national communication to the UNFCCC (October 2015), which notes that the energy sector is one of the key emitting sectors, primarily through transport and the burning of gas and diesel oils for electricity generation.^[2]
 - National Poverty Reduction Strategy and the National Adaption Strategy. Both of these documents expired in 2016 and 2017 respectively. However, the Government of St. Kitts and Nevis continues to advance a people-centric development agenda which aims to ensure socio-economic sustainability. This is evident through initiatives and structures which have facilitated positive outcomes such as but not limited to a strong education, health and social protection apparatus. This project is consistent with the overall national policy priorities established by the Government of St. Kitts and Nevis (GSKN). While aligned with the overall goal of 100% renewable grid in the present version of the National Energy, this project aims to update the National Energy Policy (NEP) and to prepare a feasible roadmap that identifies the steps towards its materialization. In fact, this project will ensure that the NEP and the NDC are perfectly aligned. The latter are currently under discussion with the support of IRENA. The development goals achieved or identified prior to and during the implementation of this project and other ongoing work will be incorporated into the documentation, operational procedures and mechanisms which result from this GEF initiative.
 - National Climate Change Policy. As stated in its National Climate Change Policy (2017), St. Kitts and Nevis strives to be at the forefront with respect climate resilient development in the Caribbean region. The Government of St. Kitts and Nevis intends to foster and guide a national process of addressing the short-, medium-, and long-term effects of climate change at the individual, community and national level. The Government of St. Kitts and Nevis will pursue a low carbon development strategy as well as build and strengthen climate resilience in its national development framework across all sectors. The proposed project represents an ambitious step forward in this direction for the sector that contributes the most to the country's GHG emissions.
 - National Energy Policy: The current National Energy Policy (NEP, 2014) in St. Kitts and Nevis established the goal of a 100% renewable-based electricity grid for the year 2020. The project will update the policy, providing a revised target along with the pathways to achieving it.

- A National Gender Policy and Action Plan is in the process of finalizing at the time of writing this PIF. The project's own Gender Action Plan (for the project execution phase) and the Gender Strategy (for the implementation of the roadmap, including after the end of the project) will be aligned to the national policy.
-
- UN Sustainable Development Cooperation Framework^[3]. The project is also consistent with the United Nations Multi-Country Sustainable Development Framework in the Caribbean (UN MSDF / UNDAF), priority area 4: A Sustainable and Resilient Caribbean. This priority area focuses on UN system support to strengthen institutional and community resilience at both regional and national levels, in terms of natural resources management; the protection and sustainable use of terrestrial, coastal and marine ecosystems; renewable energy systems; and inclusive and sustainable societies. It is also based on an integrated approach to the sustainable use and management of the natural resources and ecosystems.
- UNFCCC technology needs assessment. Finally, the proposed project tackles the recommendations in the latest (2007) Technology Needs Assessment (TNA), which highlights technologies and barriers that are addressed by this proposal. These include the appraisal of small-scale renewables and the strengthening of technical capacities to support these technologies. UNEP and UNEP DTU, with financing from the Global Environment Facility, are implementing a fourth phase of Technology Needs Assessments (TNAs). The fourth phase of the project will support seventeen Least Developed Countries (LDCs) and Small Island Developing States, including St. Kitts and Nevis, in carrying out new or improved TNAs, from 2020 to 2023. The selection of UNEP as the Implementing Agency will ensure coordination with this on-going initiative.

[1] St. Kitts and Nevis National Climate Change Policy – November 2017.

[2] <https://unfccc.int/sites/default/files/resource/Knanc2.pdf>.

[3] Formerly UN Development Assistance Framework (UNDAF)

8. Knowledge Management

Outline the knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The current lack of a repository of sectoral information (both in terms of activity data but also on on-going initiatives), as well as systematic processes and procedures to identify, capture, store, create, update, represent, and distribute knowledge for public and private decision-making and planning, awareness and learning across and beyond the energy sector, has been identified among the main barriers that are relevant for this project (see Figure 2 in the barrier analysis).

The Knowledge Management (KM) approach of the project will be tackled through a dedicated output (output 1.5). Data will be an integral part of the roadmap, as plans are data-driven and data-intensive, requiring comprehensive technical data on electrical demand and demand-side matters, the existing grid infrastructure, electrical supply assets and their performance. In addition to the technical energy system dataset, information on policy, social and economic statistics and hazard and vulnerability data are also needed to align the various stakeholders that are involved in the transition to renewables, to provide the right market signals and to keep track of the progress. Thus, a robust information and knowledge management platform is paramount to the project's objective to accelerate St. Kitts and Nevis' transition towards a zero-carbon grid.

The KM and monitoring system to be created by this project seeks to create an information repository that is regularly updated and useful to understand, communicate and steer the energy transition to a 100% renewable grid in St. Kitts and Nevis. It is envisioned that the successful implementation of this framework within the life span of the project will result in a solid foundation for the extended dissemination and exchange of climate and energy knowledge in St. Kitts and Nevis, contributing directly to the objectives in the relevant national policies (i.e. the NEP and the National Climate Change Policy). The KM approach is thus expected to meet the initial needs of the project as a temporary project/organizational structure, but with KM investments, structure, processes and systems, which will continue to be functional beyond the life of the project, with clear capacity building and institutionalization across St. Kitts and Nevis. Moreover, the KM system will play an essential part in the replication of the pilots, systematically collecting and disseminating lessons learned to relevant stakeholders, identifying what works, what to avoid, potential savings in terms of electricity and emissions (and potential costs), and gains in resilience and autonomy from the grid. It will also play a key role in supporting the integration of renewables in the grid, collecting and making available technical information for managing the transition, and allowing to transparently document and disseminate ways in which residential and commercial users can bring in renewable capacity without compromising the stability of the grid. Thus, the knowledge management system will provide transparency and signal to the wider public the price and technical conditions to inform their investment decisions.

The exact design, architecture and tools of the Knowledge Management and Monitoring System will be defined as part of the project itself (output 1.5). Potential KM solutions that will be considered in the context of this project include intranet-based systems, content management systems, BI tools, knowledge map systems and knowledge & information portals. Each of these different tools will be tailored to the needs (and capacities) of the different stakeholders and their roles in the energy sector (utility technicians, government officials, academics, civil society, banks, companies, etc.). Activities will include the development of standardized energy data collection, standardized definitions of common terminologies to be used with respect to the energy transition, KM Guidelines and

Communication Guidelines for training key personnel in the use, a repository of existing literature and reports, the systematization of experiences and lessons learned as a result of past and present interventions; implement national and regional institutional partnerships through technical exchange programs, internships, and collaborative research agreements, and a Memorandum of Understanding for the establishment of a National KM Partnership Network across key institutions of the country. The project also will support regional and south-south cooperation by assisting the GSKN in participating in national, regional and global knowledge exchanges on the topic of energy transition. The complete Knowledge Management System for the project will be developed in the project design phase.

9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

Measures to address identified risks and impacts

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

This is a moderate risk project. The Safeguard Risk Identification Form (SRIF) will be revised again during the project development phase together with the relevant local experts and stakeholders and take necessary assessment to avoid or mitigate the risks, if needed. It is recommended to develop the stakeholder engagement plan to ensure that local people's interests are fully onboard.

The rating stems primarily from the only Safeguard Standard that did not receive a low rating, namely, the Climate Change and Disaster Risks Safeguard (SS 2), as the project is to take place in a high-risk SIDS.

While most part of the work under this project involves the drafting of policies, plans, business models and a roadmap, two pilots comprised of energy efficiency measures are expected to be undertaken in each island (output 2.2). This risk will need to be thoroughly assessed during the design phase, once the specific pilots are designed, to ensure that measures to minimize the likelihood of damage are in place.

As for the possibility that climate change related events affect the implementation of project activities with identified stakeholders, the recent experience with the COVID pandemic has resulted in a great deal of flexibility in terms of shifting face-to-face activities to a virtual modality with relatively short anticipation. As a default, all communications, training and stakeholder engagement activities will be designed under two modalities (i.e. in-person and virtual) and the project team will be ready to switch between the two depending on the circumstances. This same approach will be followed in case of extreme events affecting the implementation of any project activities that involve external stakeholders, from workshops to training to communication seminars.

Lastly, it is important to stress that the outputs in the project (mainly, the road map and any grid integration studies, to be prepared during the execution of the project) will incorporate an assessment of climate change projections into its own results and recommendations, as well as a risk analysis regarding the occurrence of extreme events.

Supporting Documents

Upload available ESS supporting documents.

Title	Submitted
Safeguard Risk Identification Form (SRIF) - SKN	

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Ms. Lavern Queeley	GEF Operational Focal Point	Ministry of Sustainable Development	7/26/2021

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place





Location	Latitude	Longitude
Basseterre	17.2948	-62.7261
Charlestown	17.1392	-62.6228