

# Climate Action Enhancement Package: Belize

**Key renewable energy options**

# *Background Issues*



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1. Emissions from the power sector and fuel combustion activities in other sectors jointly represent close to 10% of total emissions of Belize in 2017 (without FOLU)
2. The specific emissions of the power sector amounted to close to 170 grams CO<sub>2</sub>eq/kWh in year 2017, including imported CFE electricity.
3. Carbon intensity is low when compared to world average figures and also when compared to EU average carbon intensity. The relatively low specific emissions associated with the power sector are due to the high share of imported electricity and renewable energy generation in the electricity mix.
4. Taking into account current emission levels, there is a limited potential for reducing emissions in these two sectors compared to the potential available in the transport and agriculture sectors.

1. Methodological approach:
  - Review of current and past proposals identifying potential mitigation options
  - Prioritization of selected options based on a multicriteria assessment
2. Selection and prioritization criteria:
  - Multicriteria qualitative methodology based on: ***availability of adequate local energy resources; technology maturity and cost; previous local implementation and expertise; implementation complexity; local O&M capacity; potential development and projects identified in official documents; local stakeholders perception; mitigation potential; other barriers and advantages.***
3. Information Sources
  - Interviews with stakeholders relevant for the energy sector
  - Comprehensive review of energy plans, assessments and data sources

# *Renewable energy options classification*



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1. Technologies with high suitability. Mature technologies that have already been developed in Belize or are included in expansion plans and will be developed in the near term.
2. Mature technologies that may have good technical potential but need to be further evaluated in order to better define their suitability for Belize, or technologies whose implementation imply major changes (e.g. infrastructure, regulatory or cultural changes).
3. Mature technologies with yet uncertain suitability and potential but that may play a role in the mid to long term.

# *Renewable energy options*



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**Category One:**  
Utility scale hydro;  
Utility scale solar  
PV; Bagasse  
cogeneration; Off-  
grid PV and hybrid  
systems; SWHs

**Category two: Distributed solar PV  
(on grid); Improved firewood  
stoves; Biogas from effluents,  
agricultural and livestock residues**

**Category three: Utility scale  
onshore wind; Arundo donax  
cogeneration in sugar mills;  
Biomass gasification; Off-grid  
micro-hydro**

# Technology Assessment - Example



Suitability for enhanced NDC	Option	Potential penetration	Timeline	Impact on GHG mitigation (in the context of total emissions, without FOLU)	Main Barriers / Requirements for its development	Main advantages and strengths
<b>Good</b>	Utility scale hydro	20MW to 30MW This includes the new Chalillo 2 project (19 MW) All or most of this power would be run-off river	Short to mid term	Limited (energy industries emissions are close to 9% of total emissions, without FOLU) Do not contribute to GHG emissions in themselves. They require an integrated assessment of the power supply sector in order to determine specific GHG emissions reduction per kWh.	Uncertainty linked to climate change impacts on water availability (assessment under way). Requires an integrated water management plan and assessing of impacts of competing land uses. A more detailed hydro resource assessment is needed. Financing.	Local experience and capacity available. A positive impact on electricity costs is expected thanks to reduced energy imports.
<b>Good</b>	Utility scale solar PV	15MW to 40MW	Short to mid term	Limited (energy industries emissions are close to 9% of total emissions, without FOLU) Do not contribute to GHG emissions in themselves. They require an integrated assessment of the power supply sector in order to determine specific GHG emissions reduction per kWh.	Requires the joint development of flexible power resources in order to reach a significant penetration rate (assessment under way). Dispatch procedure modifications. Financing. May require transmission grid expansion	Very good resource. Sites and projects already identified. Pilot project implemented (JICA). A positive impact on electricity costs is expected thanks to reduced energy imports.

# Summary of Renewable energy options for enhanced NDC

Priority index	Option	Mitigation potential	Implementation feasibility
1	Utility scale hydro	1	1
2	Utility scale solar PV	2 (does need flexible resource backup)	1
2	Bagasse cogeneration	2	2 (increase in agricultural productivity)
2	Distributed solar PV (on grid)	1	2 (regulatory changes needed)
3	Off-grid PV	3	1
3	Solar Water Heaters	3	1
3	Improved wood stoves	3	2
3	Biogas	3	2
Uncertain	Utility scale onshore wind power	Uncertain	Uncertain
Uncertain	Arundo donax CHP	Uncertain	Uncertain
Uncertain	Biomass gasification	Uncertain	Uncertain

Notes: 1 Higher, 3 Lower, relative scale within the energy sector. Mitigation potential assessment based on current energy demand and weight of emissions within energy sector according to GHG inventory. Implementation feasibility takes into account barriers and opportunities.