Grid integration assessment:
Dominican Republic

IRENA
International Renewable Energy Agency

DOMINICAN REPUBLIC (2018) POWER SYSTEM CONDITIONS

- Current system uses mainly natural gas, coal and petroleum-based fuels
- Study shows potential for 1.7 GW of solar PV and 2.3 GW of wind power

GRID INTEGRATION ASSESSMENT

IRENA's study indicates:

- Technical challenges
- Policy changes needed to achieve renewable energy targets
- Solar and wind shares feasible for secure and reliable system operation

SUSTAINABLE ENERGY POTENTIAL

By 2030, the Dominican Republic could be using:

Wind ↑ **36%** **Gas** ↓ **25%**

Solar ↑ **24%** **Coal** ↓ **15%**

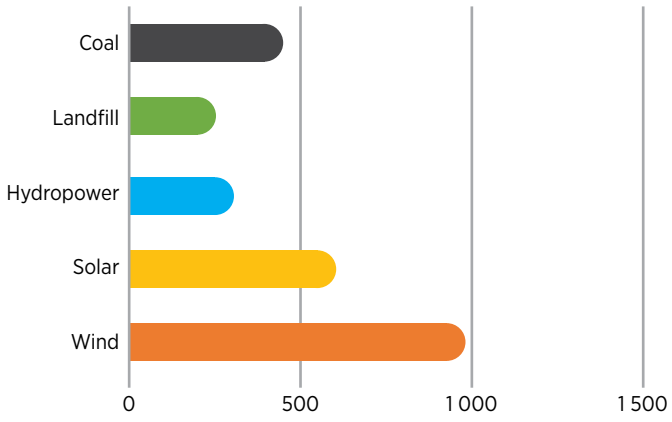
Fuel ↓ **26%**

vs. 2018 base year

OPTIMAL 2030 GENERATION MIX (%)

Coal	17%
Solar	24%
Wind	39%
Landfill	9%
Biomass	0%
Hydropower	11%
Fuel	0%
Gas	0%

OPTIMAL 2030 GENERATION MIX (MW)



The country could meet mean demand in 2030 with 984 MW of wind, 611 MW of solar, 419 MW of coal, 220 MW of landfill and 288 MW of hydropower generation.

RECOMMENDED GRID UPGRADES

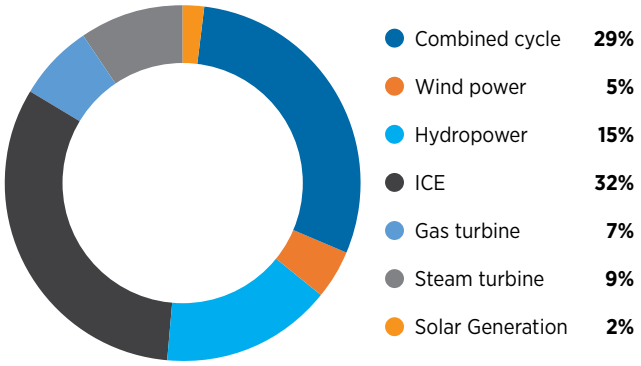
- Battery storage capacity
- Grid reinforcement
- Parallel transmission lines
- Corrective measures

Summary of findings

from IRENA's Grid Integration Assessment for the **Dominican Republic**

THE POWER SYSTEM

The total power capacity installed in the Dominican Republic at the end of 2017 reached 5 131.41 MW. Auto-producers used fossil fuels as their primary energy resource (87.77%), alongside solar energy (4.76%), cane husk (3.79%), and biomass and biogas (1.96%). Demand in 2018 was 15 886 GWh.



THE STUDY

Renewable energy roadmap (REmap) analysis by the International Renewable Energy Agency (IRENA) in 2016 identified the potential for 1.7 GW of solar PV and 2.3 GW of wind power that could be integrated into the power system of the Dominican Republic by 2030. This capacity could result in a renewable share of around 43% in total electricity production and a 25% share for non-conventional variable renewable energy resources (PV and wind).

IRENA's subsequent grid-integration study aims to assist the Dominican Republic in the pursuit of formulated objectives. The study provides technical analysis and proposes policies to facilitate deployment of renewable-based power generation, in accordance with REmap analysis for the year 2030 and associated targets for reducing CO_2 emissions.

MW = megawatt
GW = gigawatt
GWh = gigawatt hours
PV = photovoltaic
ICE = internal combustion engine

POWER SYSTEM MODELLING AND SIMULATION STUDIES

Unit commitment and economic dispatch over a period of one year were optimised using PLEXOS®, while the power system model was created in Digsilent PowerFactory®.

The following network studies were performed for different scenarios, with varying proportions of renewables for the years 2020 (peak and low demand snapshots), 2025 (peak and low demand snapshots) and 2030 (peak, mean and low demand snapshots):

- **frequency stability analysis;**
- **transient stability analysis; and**
- **contingency analysis.**

RECOMMENDATIONS

The Dominican Republic's policy makers and grid operators are advised to consider:

- **Installing batteries for frequency support;**
- **Under-frequency load shedding;**
- **Reinforcing the grid, building new, parallel transmission lines and installing shunt devices for voltage control;**
- **Corrective operational measures;**
- **Must-run synchronous generation.**

SYSTEM DEVELOPMENT OPPORTUNITIES

In the REmap scenario, the **peak demand** at a given point in time could be met by **1144 MW** of wind, **1570 MW** of gas, **660 MW** of hydropower, **220 MW** of landfill and **700 MW** of coal. The REmap 2030 **mean demand** scenario could be met by **984 MW** of wind, **611 MW** of solar, **419 MW** of coal, **220 MW** of landfill and **288 MW** of hydropower generation.

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