



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile



Renewable energy in Djibouti: a political, technical and economic assessment

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ENEA



Session 19 - Pathway to transition: the cooperation role (special session organized by ENEA)

Republic of Djibouti

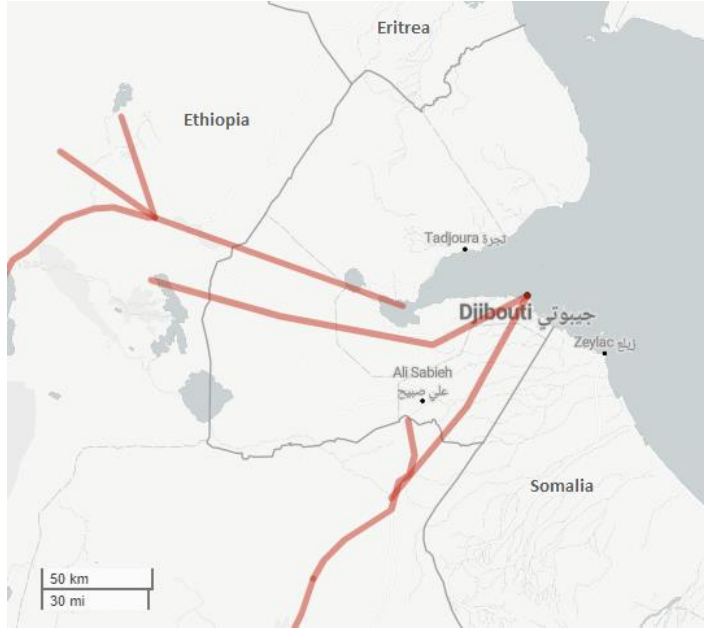


Country background

- Small African country but with a strategic geographic location as a bridge between the Middle East and Africa
- ~17% of the population is still below the international poverty line of USD 1.90
- Economy depends largely on foreign investment
- High level of energy dependency
- High vulnerability of economy

Vision 2035

Djibouti government has set an ambitious target:
from 100% of fossil fuel to 100% renewable energy
(INDC = -40% GHG emission)



Djibouti Electricity Interconnection Network:
the high-voltage interconnection with Ethiopia

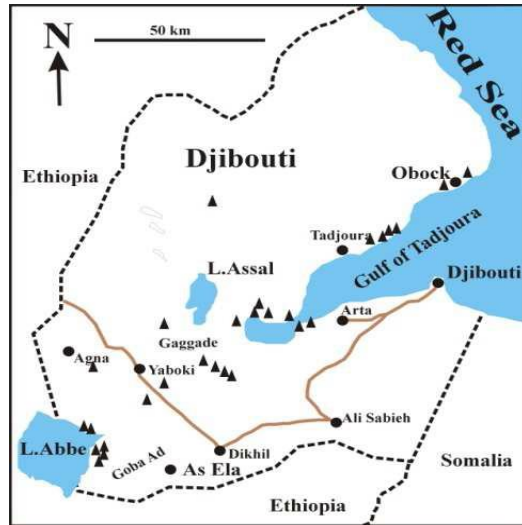
Energy in Djibouti

- High level of dependency from imported fossil fuels and electricity imports from Ethiopia
- Inefficient electricity infrastructure
- High electricity tariffs
- Lack of transmission and distribution grid
- Low access to the energy in rural and urban areas (problem also in the quality of connection)

RES potential in Djibouti

Djibouti could potentially develop a diversified portfolio of renewable energies to cover its full estimated needs by 2035, but not all the potential is really economically and technically exploitable.

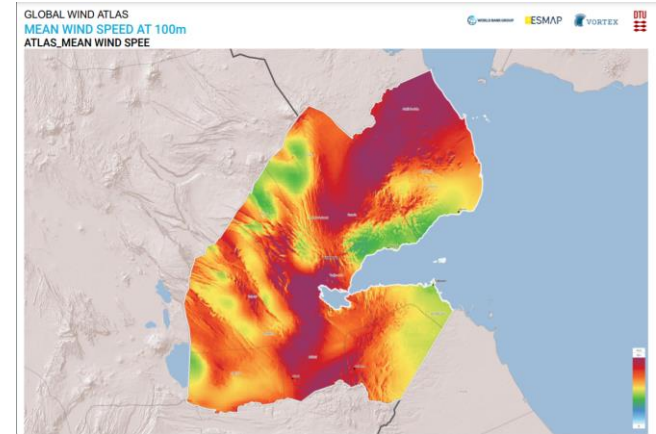
Geothermal energy



Solar energy

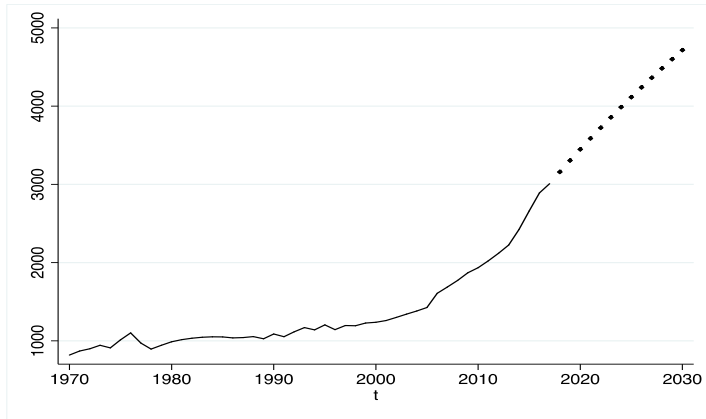


Wind energy



Our study:

Forecasting of real GDP (2011 USD millions)



Potential mix of renewables in Djibouti: Scenarios evaluated to 2030

Scenario 1 Full independence	Scenario 2 High Independence	Scenario 3 Medium independence
100%	80%	63%

Considering a constant capacity factor of 5700 hours

We obtain that the calculated technical needs in terms of power to be installed by 2030 range between 474 and 640 MW, but due to the seasonal, weekly and daily fluctuations of photovoltaics and wind power for a very optimal solution a hydro storage system should be planned.

Our study:

Potential mix of renewables in Djibouti: Scenarios evaluated to 2030

Scenario 1 Full independence	Scenario 2 High Independence	Scenario 3 Medium independence
100%	80%	63%
Solar energy (63%)	Solar energy (47%)	Solar energy (32%)
Wind energy (22%)	Wind energy (9%)	Wind energy (12%)
Geothermal energy (15%)	Geothermal energy (8%)	Geothermal energy (10%)
	Ethiopia connection1 (13%)	Ethiopia connection1 (16%)
	Ethiopia connection2 (23%)	Ethiopia connection2 (30%)
Hydro storage	Hydro storage	

The diversification mix is built to avoid seasonal breakouts and sustain the economic growth projections foreseen for the country, but the choice of how to plan the future energy strategy is a policy option.

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