

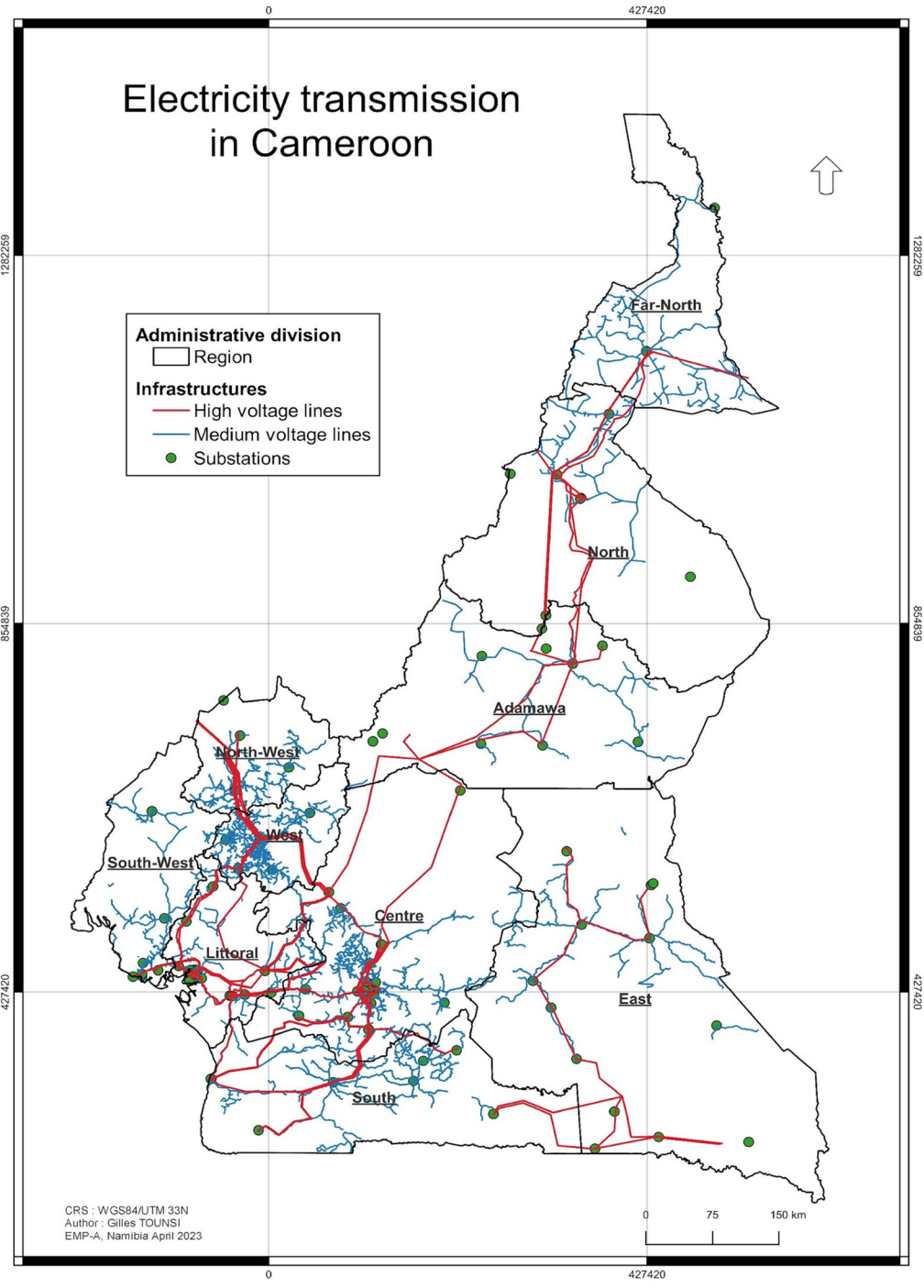


What is the least cost solution for electricity access in Cameroon?



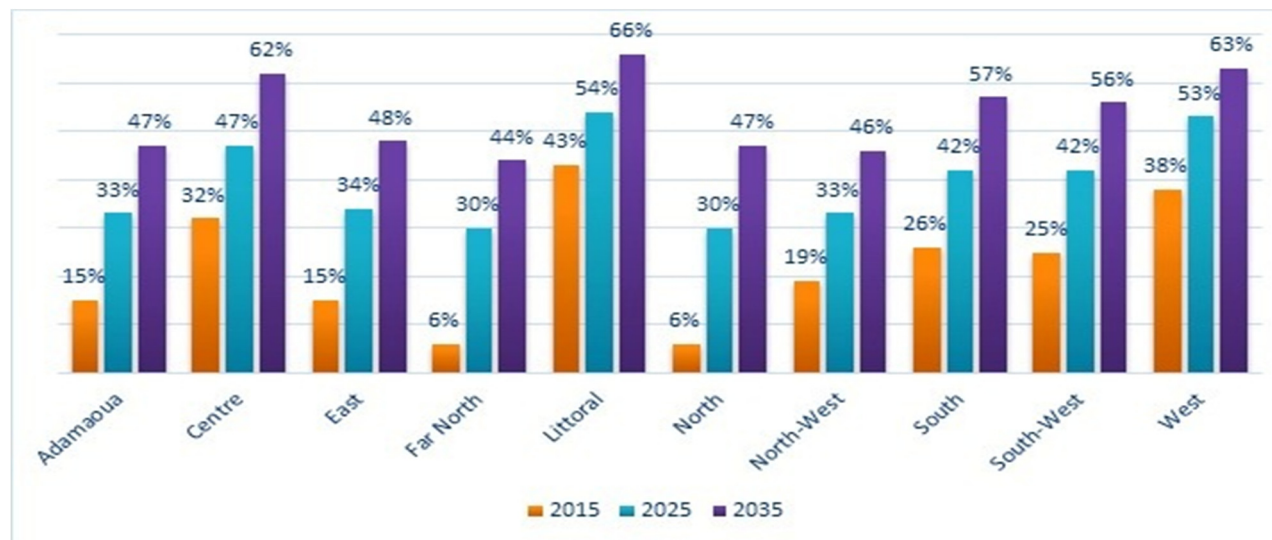
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Energy Modelling Platform for Africa (EMP-A)
 Namibia 2023



Context and Challenge

- National Electrification Rate : National: 63%
- Urban: 93% - Rural: 23% (World Bank)
- Electricity generation dominated by hydroelectricity (76%) for 72.2% of the total capacity generation (SeForAll)
- Global Horizontal Irradiation 6 kWh/m²/day in the Far North (GlobalSolarAtlas)



Timeline target for electrification rate in Cameroon per region
Source : World Bank

- Access remains the big challenge
- Average electricity consumption per
- Household: 287 kWh/year
- Capita: 91 kWh/year (Tier 2)
(World Bank)
- Only 20% of the population would actually have continuous access to electricity. (Of 27 millions/2015)
- Overall mismatch between supply and demand
- Irregularity of supplies due to the low water period
- The mix of technologies is an opportunity

Addressing the challenge...

- Based on the GEP-OnSSET model : Electricity production is divided into the following technologies
 - GIS energy planning can determine the area with high demand target by analyzing GDP and Poverty indices
 - The Far North of the country is the preferred target
 - Higher GHI irradiation is experience in the Far North
- Hydroelectric Power plants
- Thermal Power Plants
- Solar power plants
- Wind

What technologies are favorable to access the electricity?



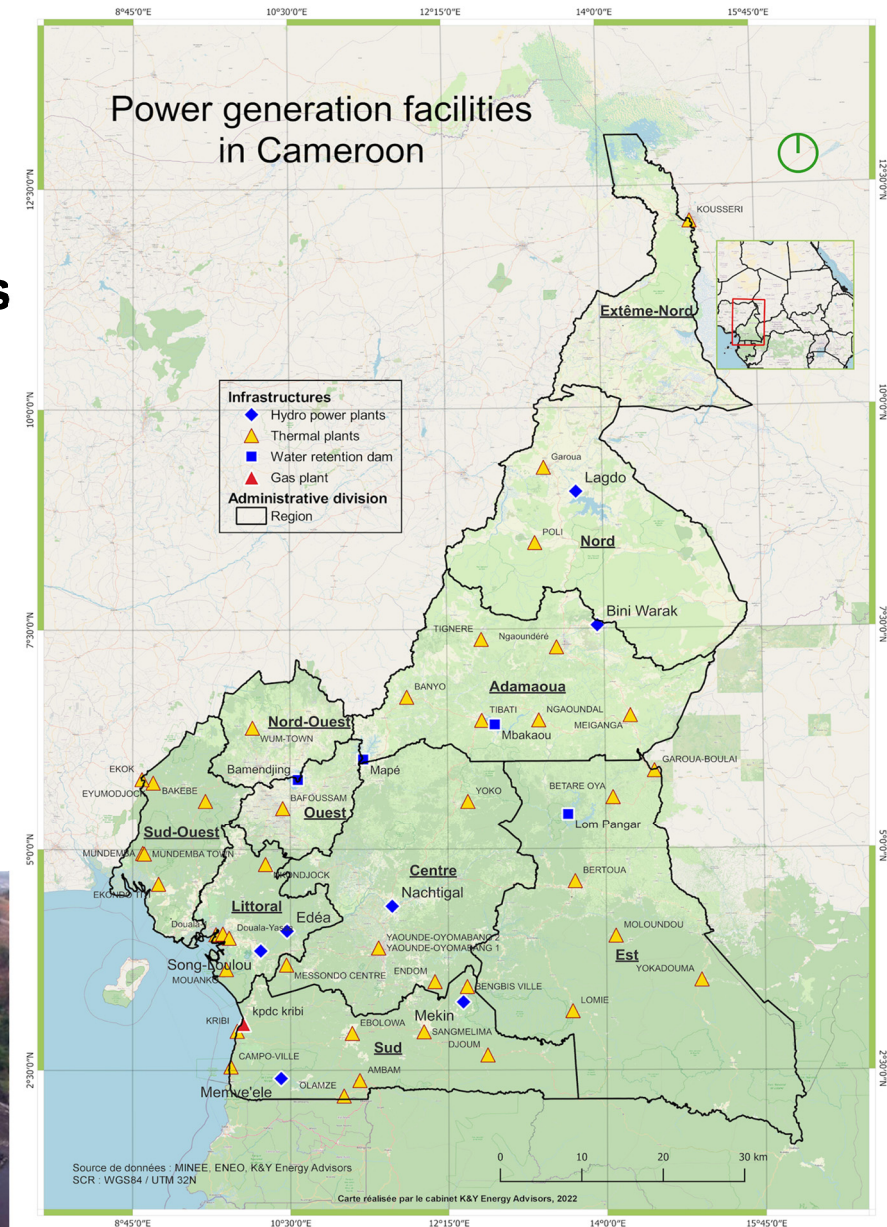
Solar power Plant
Source : World Bank Madagascar



Kribi Thermal Power plant
Source : Africa Energy Portal



Nachtigal Dam
Source : World Bank, Cameroon

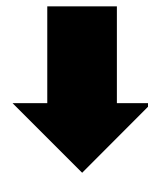


Source : K&Y Energy Advisors

Scenario & Parameters

One Scenario based on the inputs

Baseline inputs



Analysis

- Electricity per technologies
- Technologies per region
- Technologies costs for Off-Grid

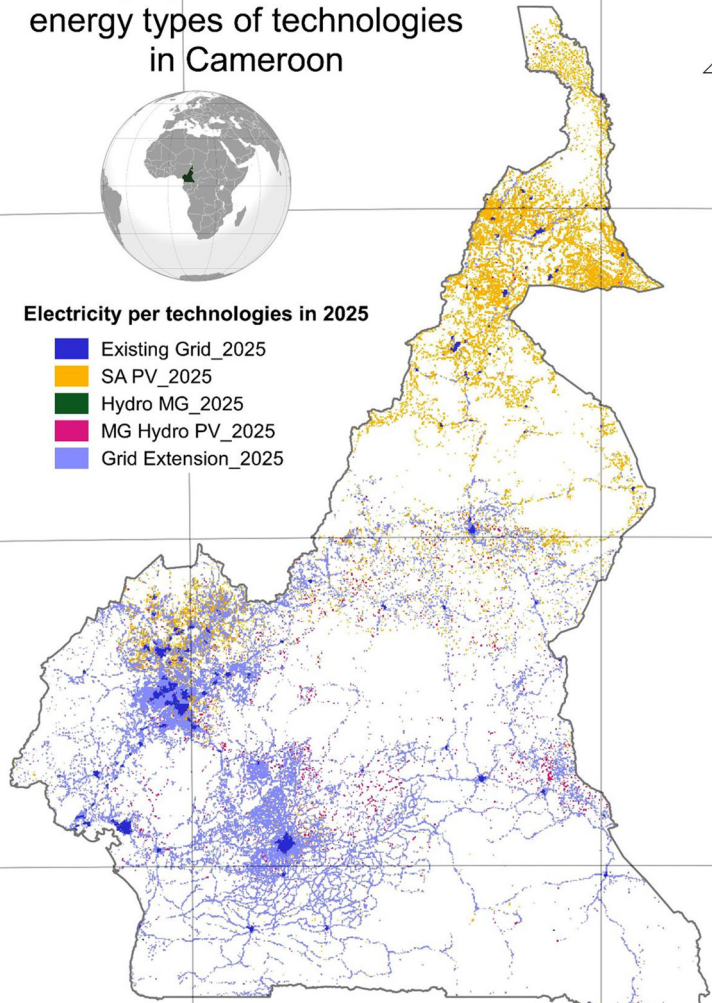
- Population (2020): 25.216 million
- Population (2030): 33.766 million
- Bottom-up high demand target by GDP Poverty.
- 2020 Urban Ratio Start Year 57%
- 2030 Urban Ratio End Year 67%
- Residential Demand Targets*
 - tier_1 = 48
 - tier_2 = 276
 - tier_3 = 1012
 - tier_4 = 2667
 - tier_5 = 3771
- * **tier per kwh/household/year**

Geographic distribution of energy types of technologies in Cameroon

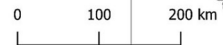


Electricity per technologies in 2025

- Existing Grid_2025
- SA PV_2025
- Hydro MG_2025
- MG Hydro PV_2025
- Grid Extension_2025



Data source : Utilities, Global Electrification Platform GEP, OnSSET
CRS : WGS84/UTM 33N
Author : Gilles TOUNSI
Generated at 2023 EMPA, Namibia



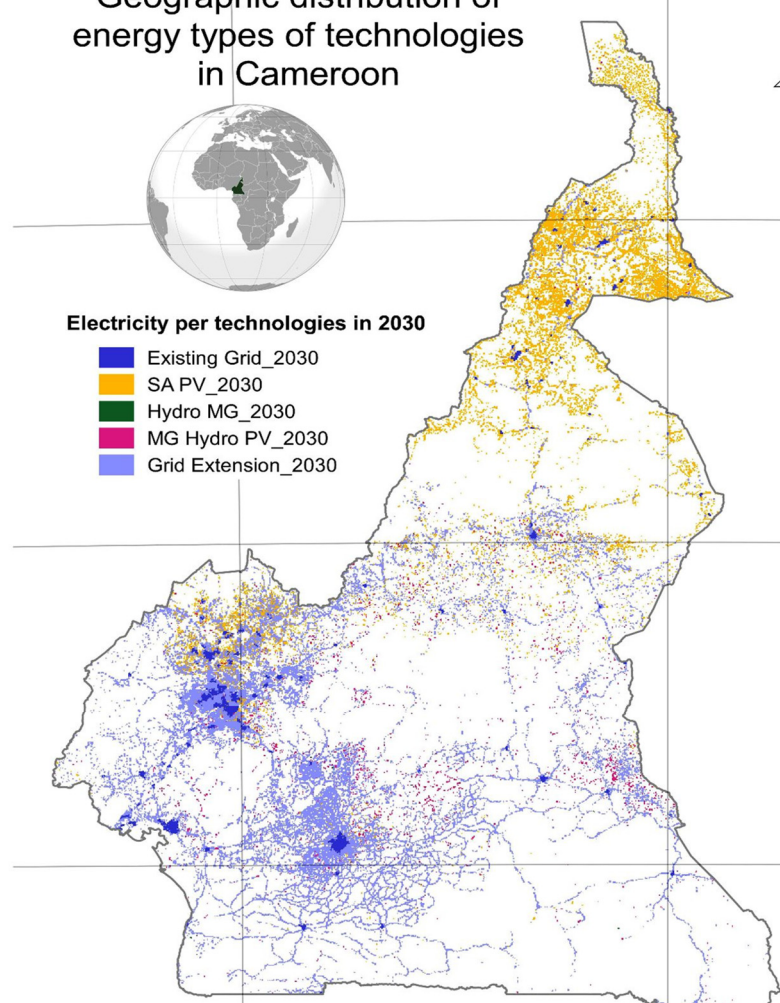
Electricity per technologies in 2025
Source : GEP-ONSSET Output

Geographic distribution of energy types of technologies in Cameroon

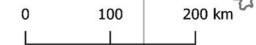


Electricity per technologies in 2030

- Existing Grid_2030
- SA PV_2030
- Hydro MG_2030
- MG Hydro PV_2030
- Grid Extension_2030



Data source : Utilities, Global Electrification Platform GEP, OnSSET
CRS : WGS84/UTM 33N
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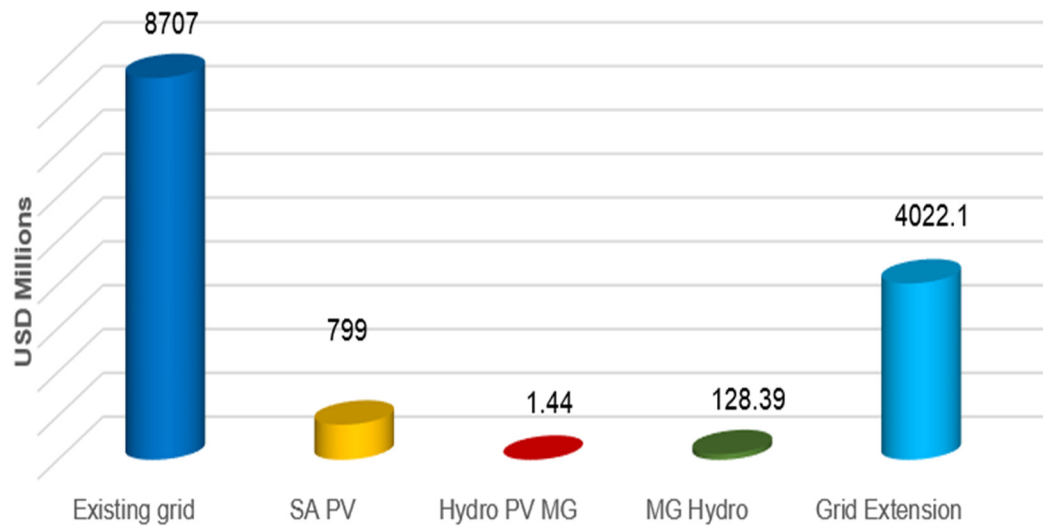
Electricity per technologies in 2030
Source : GEP ONSSET output

Results maps

Results graphs

Existing grid : USD 8707.9
 SA PV : USD 799 M
 Hydro PV MG : USD 1.44 M
 MG Hydro : USD 128.39 M
 Grid Extension : USD 4022.11 M

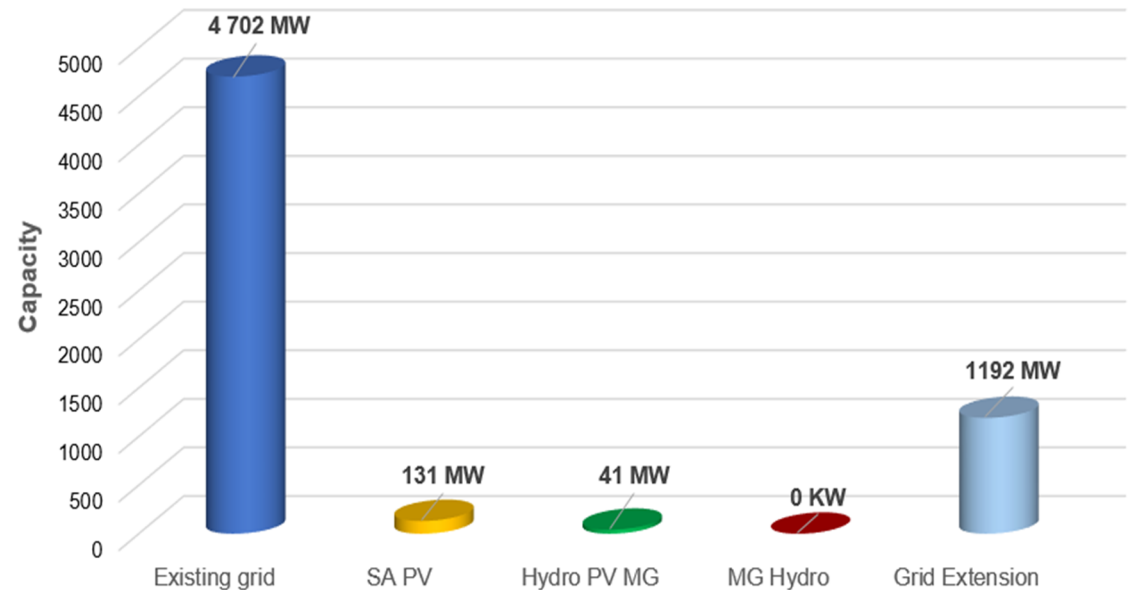
Total investments in 2030
 13.659 Millions USD



Technologies Investments cost in 2030
 Source : GEP-ONSSET Output

Existing grid : 4702 MW
 Grid Extension : 1192 MW
 SA PV : 131 MW
 Hydro PV MG : 41 MW
 MG Hvdro : 0 MW

Total Capacity in 2030
 6.066 MW



Capacity generated in 2030
 Source : GEP-ONSSET output

Results Table (1000s of people)

Region	Grid densification	Solar-home systems	Mini-grids	Grid extension
Adamaoua	306.0	31.0	NaN	307.0
Centre	2884.0	39.0	NaN	465.0
Est	204.0	20.0	0.0	246.0
Extrême - Nord	798.0	164.0	8.0	574.0
Littoral	2688.0	10.0	1.0	203.0
Nord	689.0	81.0	0.0	385.0
Nord - Ouest	678.0	49.0	0.0	428.0
Ouest	812.0	31.0	NaN	420.0
Sud	169.0	13.0	1.0	160.0
Sud - Ouest	634.0	19.0	5.0	292.0

Table : Technologies per region

Source : Python GEP-ONSSET Generator

Conclusions and Policy Insights

- Least costs technologies depend to the environment.
- Cameroon Far North region has a potential for GHI irradiation.
- Investments cost are planned with off-grid Solar Stand Alone Systems.

Note : Cameroon does not recognize the off-grid technologies such as Solar Home System and Mini Grid PV as a lever of electrification rate

- Customs duties exemptions & VAT exemptions.
- Advocacy with NREA (including the financial support UE/WB....)
- Off-grid technologies represent an opportunity to increase the national rate with the inclusion NGO's, Minigrid & off-grid developers, civil society....
- Credit loans should be available for SME's involving in the field of energy, particularly renewable energy.

Future Work

- Start the capacity building of Global Electrification Platform (Comoros)
- My Goal : continue to share the practice of the tool with Gov., Decision makers and the private sector



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THANK YOU !

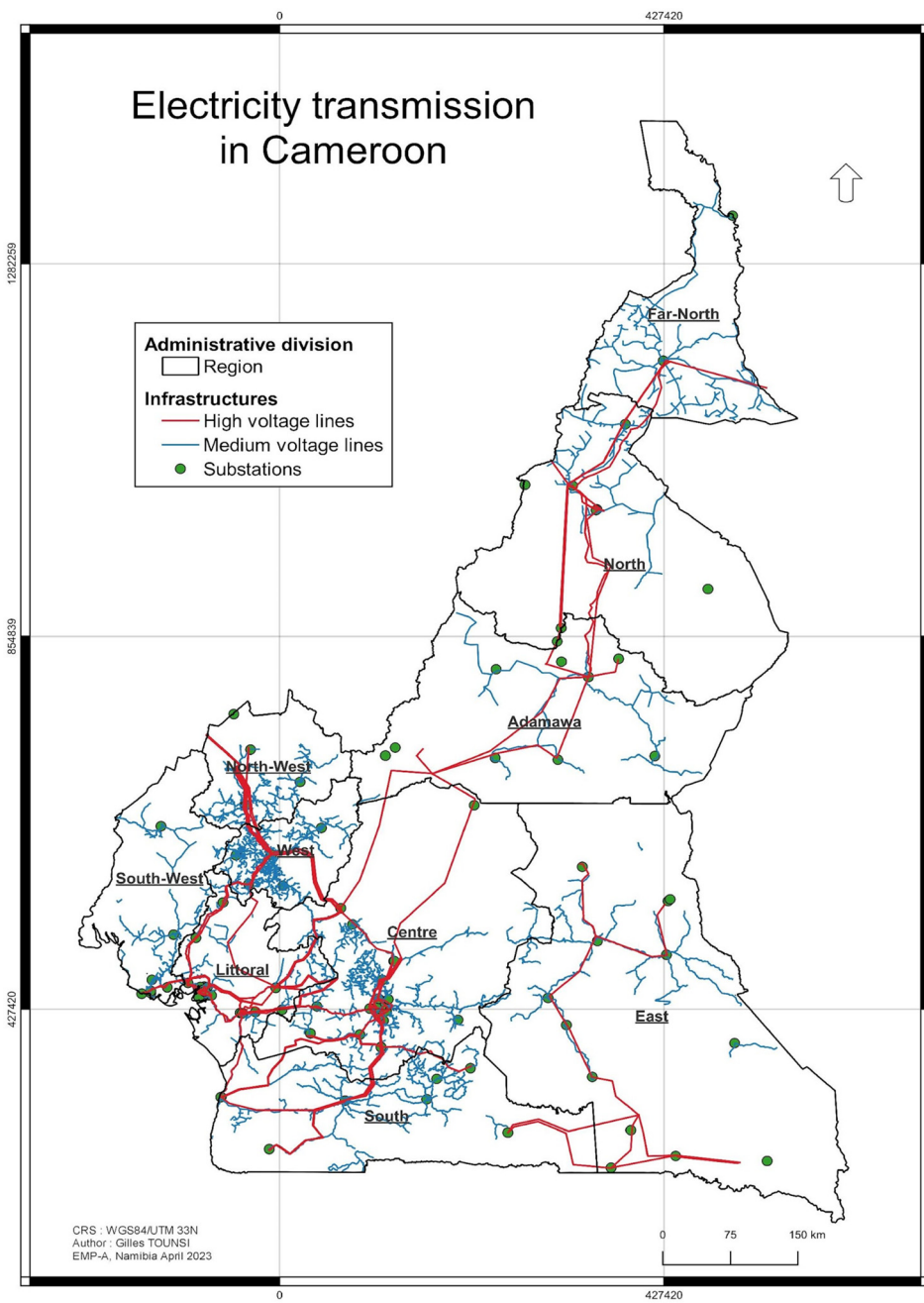
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