



Territorial Diagnosis of Electricity Accessibility through Electrification Services in Mali

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Abstract

Access to electricity in Mali remains one of the lowest in the world, with a national rate of 51% marked by significant disparities between urban and rural areas. This study assesses the territorial distribution of electricity coverage provided by national electrification services. The methodology is based on the use of geographic information systems combined with multi-criteria decision support analysis to identify the localities concerned. The data used includes municipal demographic statistics, national energy data, the number of low-voltage subscribers, the population served by locality, and municipal boundaries from geospatial databases. This information was used to assess the territorial distribution of electricity coverage rates. The analysis reveals low penetration of energy services nationwide. Of the 703 municipalities surveyed, only 268 are served, representing a rate of 38% (22% by EDM and 16% by AMADER). Furthermore, when the calculation is based solely on the population that actually has access to electricity in the areas served, the rate drops to 26%. This discrepancy is mainly due to a difference in calculation methods. This significant disparity, confirmed by both official figures and the study's results, reflects the concentration of electrical infrastructure in urban areas, to the detriment of rural areas that are still largely uncovered, but also differences in calculation methods. The very low rate of access in rural areas highlights the urgent need for decision-makers to promote decentralized systems, particularly solar solutions, as a strategic alternative to accelerate rural electrification.

Subject Areas

Electric Engineering

Keywords

Access to Electricity, Regional Disparities, Rural Electrification, Geographic

1. Introduction

Mali's electricity system relies heavily on costly and polluting thermal sources. This results in both insufficient production and unequal access to electricity.

The change in the percentage contribution of different sources to electricity production in Mali between 2018 and 2022, as indicated in the 2022 report by Energie du Mali EDM-SA, provides the percentage of different sources of electricity production.

According to this report, thermal energy dominates with 43%, followed by hydraulic energy with 33% and purchases from the Republic of Côte d'Ivoire with 22%. Solar energy, on the other hand, accounts for only 2% [1]. Solar potential remains largely untapped in Mali [2]. Thanks to strong sunshine and long hours of solar exposure, IRENA estimates that Mali could produce around 7906 TWh of electricity per year through the deployment of solar systems [3].

In 2020, Mali had a national electrification rate of 50.56%, with 96% in urban areas and 21.12% in rural areas. This translates into 10.24 million people with access to electricity compared to 10.01 million people without access to electricity. In rural areas, 8.79 million people did not have access to electricity [4].

The lack of access to electricity is linked to disparities in access rates between localities. Changes in the rate of access to electricity in Mali during the period from 2001 to 2023 provide figures for each of the regions covered by this study. According to this report, the district of Bamako remains well ahead over the entire period, exceeding 89% in 2023. Regions such as Kayes, Koulikoro, Sikasso, and Ségou show rates between 40% and 70%. On the other hand, regions such as Mopti, Gao, and Timbuktu lag behind, with less than 30% [5]. In rural areas, only 16.7% of the population has access to electricity in Mali [3]. However, the DNE indicates that the national rate of access to electricity is 51%, of which 24% is in rural areas and 86% in urban areas [6].

Several studies have analyzed solutions for improving access to electricity, particularly in areas where the expansion of the electricity grid remains limited. This research highlights the role of appropriate energy policies and decentralized systems, such as distributed generation and mini-grids based on renewable energies.

For example, CUENCA *et al.* (2024) propose a policy for small-scale distributed generation that takes into account the limitations of the electricity grid. The results of their study show that this policy would provide access to electricity to 364,064 additional customers compared to the current policy, without requiring any upgrades to existing infrastructure [7].

In the same vein, Philipp A. Trotter (2019) assesses the potential of mini-grids based on renewable energies to improve access to electricity. His study highlights that these systems are an effective solution for expanding electrification, particu-

larly in remote areas of developing countries where extending the national grid is difficult and costly [8].

Only a few studies address the discrepancies in access rate data without specifying the methods used to calculate this rate.

Despite numerous studies on access to electricity, it remains necessary to address methodological and statistical aspects in calculating access rates in order to resolve the problem of discrepancies between data.

2. Data-Methods

2.1. Study Area

The study area consists of Mali's 703 municipalities, which constitute the study area (Figure 1) [9].

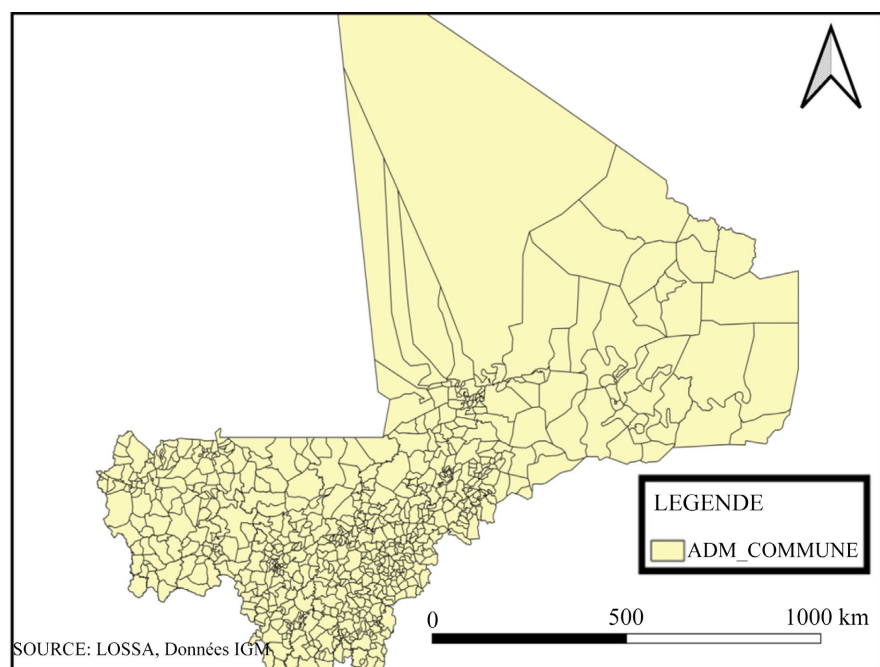


Figure 1. Study area.

2.2. Equipment

▪ **Devices used:**

GPS: To determine the coordinates of several points in the municipalities concerned.

Laptop: For data analysis and report writing.

▪ **Software:**

✓ **PVSyst:** Software used for photovoltaic modeling. It provides access to the database based on image processing from the Meteosat Second Generation satellite. It was therefore used in this research to process satellite images of the various municipalities concerned.

✓ **Microsoft office:** The company's proprietary office suite.

- ✓ **Excel:** Used to organize, analyze, visualize, and manipulate data using its spreadsheet, formula, and charting features.
- ✓ **PVGIS:** Software used in photovoltaic modeling. It provides access to a database built from satellite image processing.
- ✓ **ArcGIS 10.3 and QGIS 3.32.3:** This Geographic Information System software was used for digitization (map digitization), file conversion, data editing and modeling, visualization of created spatial data, spatial information management, and spatial analysis.

These devices and software enabled us to generate the necessary information in these municipalities to analyze the data and generate maps.

2.3. Data

2.3.1. Geospatial Data on Mali's Administrative Boundaries

In this study, geospatial data on Mali's administrative boundaries, provided by the Geographic Institute of Mali (IGM) in shapefile (SHP) format, were used to precisely delimit the various territorial entities analyzed. The different categories of data used are as follows:

- **Regional boundaries:**

Provided by the Geographic Institute of Mali (IGM) in shapefile (SHP) format. The regional boundaries delimit the eight major administrative subdivisions of Mali under the former administrative division, to which the district of Bamako is added.

- **Circle boundaries:**

Provided by the Geographic Institute of Mali (IGM) in shapefile format (SHP). The circles represent an intermediate subdivision between regions and municipalities. The 49 circles included in this study allow for a more refined territorial analysis that takes into account local administrative and geographic realities, while facilitating decentralized management and sectoral planning [10].

- **Municipal boundaries:**

Provided by the Geographic Institute of Mali (IGM) in shapefile (SHP) format. The 703 municipalities, 29 of which have urban status, constitute the basic administrative level directly concerned by local development policies. Geospatial data on municipal boundaries were used to identify target areas. These data are vector-based and reflect Mali's former administrative divisions. They were collected from the databases of the Mali Geographic Institute (IGM). This vector file contains various geographical information on the 703 municipalities, the eight (8) regions plus the district of Bamako, and the 49 circles of Mali's former administrative division [10]. It provides all the necessary information on the latitude, longitude, boundaries, and surface area of all the files covered by the study.

- **Demographic statistics:**

In this study, municipal demographic statistics are taken from the Fourth General Population and Housing Census (RGPH 4) conducted in Mali by the National Institute of Statistics (INSTAT) and the Central Census Bureau (BCR). These data provide detailed information on the population by municipality, including an av-

erage annual population growth rate of 3.6% between 2009 and 2022 [10]. They were used to assess basic service needs, particularly electricity, taking into account local demographic dynamics.

2.3.2. Collection of Data on Power Plants

As part of this study, energy data was collected from several national institutions, including the National Energy Directorate (DNE) and the Malian Agency for the Development of Domestic Energy and Rural Electrification (AMADER). This information, covering the period 2009-2023, includes the location of power plants, the situation of the various localities covered by electrification services, their installed capacity, and their energy source (thermal, solar, hybrid, or hydraulic). It has made it possible to take stock of national energy coverage and identify areas that are still unserved.

2.3.3. Collection of National Energy Data

National energy data was collected from the National Energy Directorate (DNE) and the Malian Agency for the Development of Domestic Energy and Rural Electrification (AMADER). The main energy data collected are as follows:

Data files on localities with access to electricity services:

a) Localities served by the EDM interconnected network:

The data in **Table 1** comes from the National Energy Directorate (DNE), which is the governmental agency body responsible for planning and monitoring national energy policies (year, 2022).

Table 1. BT subscribers and meter usage density by region (RI).

Localities	BT subscribers	People/meter
Bamako	407,432	10.83
Koulikoro	35,921	10.83
Kayes	31,063	10.83
Ségou	33,912	10.83
Sikasso	36,187	10.83
Mopti	4800	10.83
Gao	0	10.83
Kidal	0	10.83
Tombouctou	0	10.83

b) Localities served by EDM's isolated centers:

The data in **Table 2** comes from the National Energy Directorate (DNE), which is the governmental agency body responsible for planning and monitoring national energy policies.

Table 2. BT subscribers and meter density by region (isolated EDM centers).

Localities	BT subscribers	Person/meter
Mopti	26,314	6.3
Tombouctou	12,746	6.3
Sikasso	9556	6.3
Gao	11,501	6.3
Kayes	6742	6.3
Ségou	7703	6.3
Koulikoro	5661	6.3
Kidal	822	6.3
Bamako	0	-

c) Served by AMADER:

With regard to the areas served by AMADER, the data was collected from the Rural Electrification Directorate (DER), specifically the Project Monitoring Service in 2022, and is summarized in **Table 3**. This data reflects operational expertise in the field, given AMADER's role in the development of mini-grids and autonomous photovoltaic systems in rural areas.

Table 3. BT subscribers and average household size by region (AMADER power plants).

Region	BT subscribers	Average household size
Kayes	25,149	6.5
Sikasso	20,781	6.5
Tombouctou	3437	5.5
Koulikoro	8830	6.6
Mopti	8329	5.4
Ségou	6651	6
Gao	842	6
Kidal	46	5.4
Bamako	-	-

2.4. Data Analysis Method

This is both qualitative and quantitative.

2.4.1. Qualitative Analysis: Territorial Distribution of Access to Electricity

Assessing the geographic distribution of access to electricity is essential for effective planning, and the criteria-based binary classification method is an effective way to identify such areas [11]. The “criterion-based binary classification method”

(or “multi-criteria binary analysis”) was used. This is a method in which each site is evaluated based on specific criteria (EDM, AMADER, network coverage), assigning it only values of 0 or 1, and then classifying the sites according to these results. However, we have established options and criteria for effective decision-making.

▪ **Options for selecting municipalities:**

The choice of options makes it possible to distinguish between municipalities with higher priority and those with lower priority for the deployment of decentralized PV systems:

- Option 1: Priority municipalities (have no access to any electrification services).
- Option 2: Lower priority municipalities (have access to at least one electrification service).

Selection criteria by locality:

The selection criterion is applied by assigning a binary score of 0 or 1 to the localities concerned.

Criterion 1: Electricity service coverage by EDM-SA

Criterion 2: Electricity service coverage by AMADER

Criterion 3: National network expansion plan

0: Access to electricity is not guaranteed in the municipality.

1: Access to electricity is guaranteed in the municipality.

The municipalities suitable for PV installation were selected in each locality A, B, C, and D and form a single locality that we have designated E (high-priority municipalities) with a score of 1 for each criterion represented in **Table 4**.

Table 4. Selection of suitable localities.

Localities	EDM-SA	AMADER	Interconnected network extension
Locality A	1	0	1
Locality B	0	1	0
Locality C	1	1	1
Locality D	0	0	1
Locality E	0	0	0

Using QGIS 3.36.3 software, we located, delimited, and classified the municipalities according to locality **Table 4**.

Using QGIS 3.36.3 software, we located the different municipalities that met these criteria and classified them according to location, for a total of 435 municipalities.

2.4.2. Quantitative Analysis

This enabled us to calculate: The rates of access to electricity, photovoltaic coverage, and installed capacity for each municipality, expressed as a percentage [12]:

$$\checkmark \text{ Access rate (\%)} = \frac{\text{Number of subscribers} \times \text{Number of people per meter}}{\text{Total population of the locality}} * 100, \quad (1)$$

$$\checkmark \text{ Territorial coverage rate (\%)} = \frac{\text{Number of localities served}}{\text{Total number of localities}} * 100, \quad (2)$$

$$\checkmark \text{ Installed capacity rate (\%)} = \frac{\text{Installed capacity per service}}{\text{Total number of localities}} * 100, \quad (3)$$

3. Results

3.1. Territorial Distribution of Access to Electricity in Mali

3.1.1. Municipalities Served by Energie Du Mali

Figure 2 below shows the distribution of the different municipalities served by Mali's interconnected energy network.

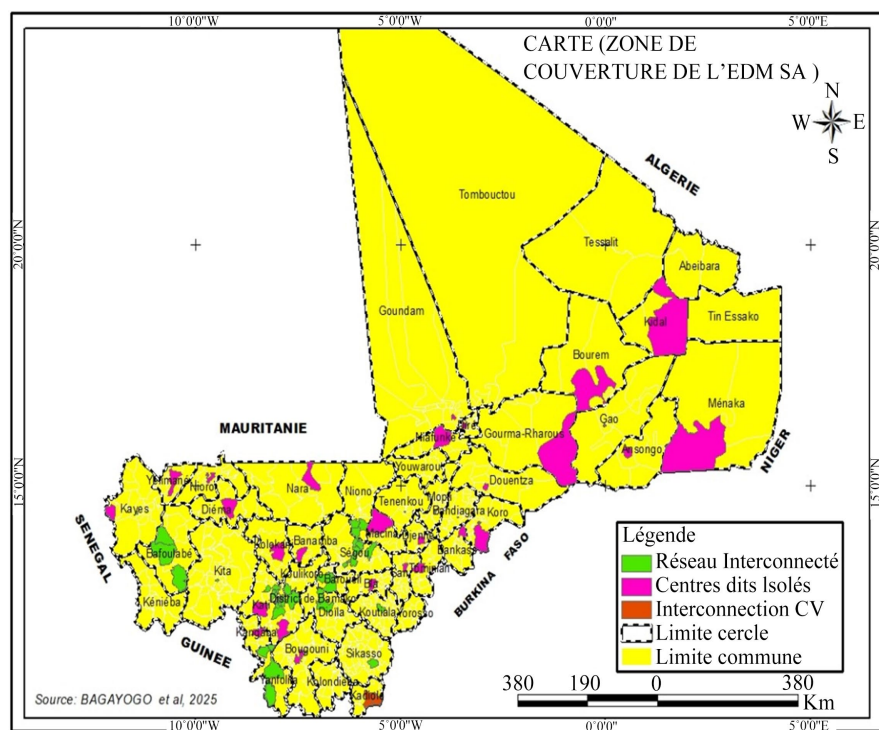


Figure 2. The EDM's interconnected network (RI).

According to the figure, the interconnected network (RI) covers 35 municipalities in green, mainly in the south and center of the country. The isolated centers (CI) serve 33 municipalities in purple spread across the country. Two (2) municipalities, in red, benefit from interconnection with Côte d'Ivoire.

A total of 70 urban municipalities are served by EDM, representing approximately 9.96% of the municipal territory.

3.1.2. Municipalities Included in the EDM-SA Expansion Plan

Figure 3 shows the various municipalities included in the electricity expansion plan by Energie du Mali.

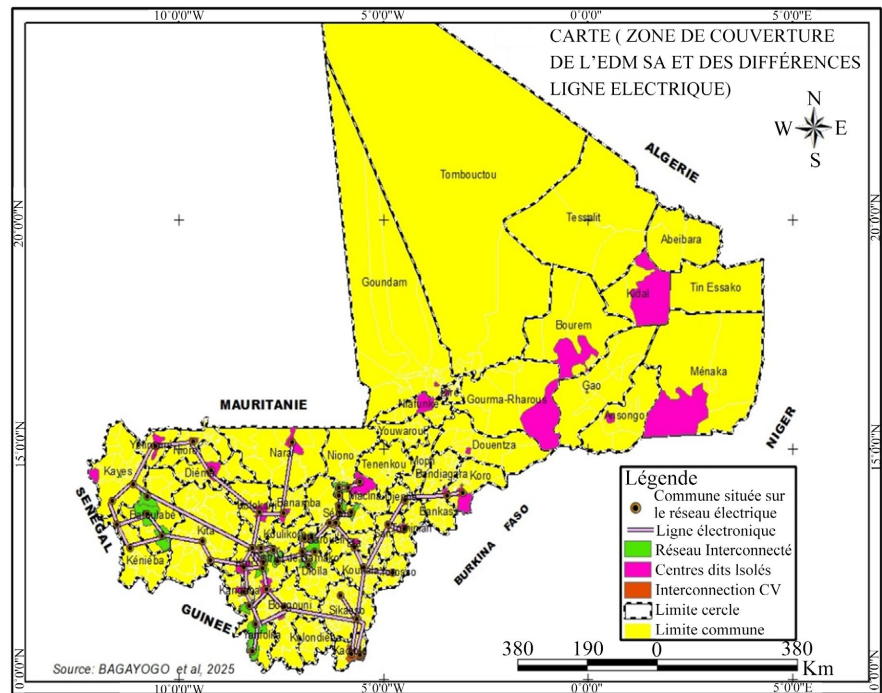


Figure 3. Municipalities covered by the EDM expansion plan.

According to **Figure 3**, a total of 81 municipalities are covered by the EDM expansion plan, representing 11.52% of the territory.

3.1.3. Municipalities Served by AMADER

Figure 4 below shows the distribution of the different municipalities served by AMADER.

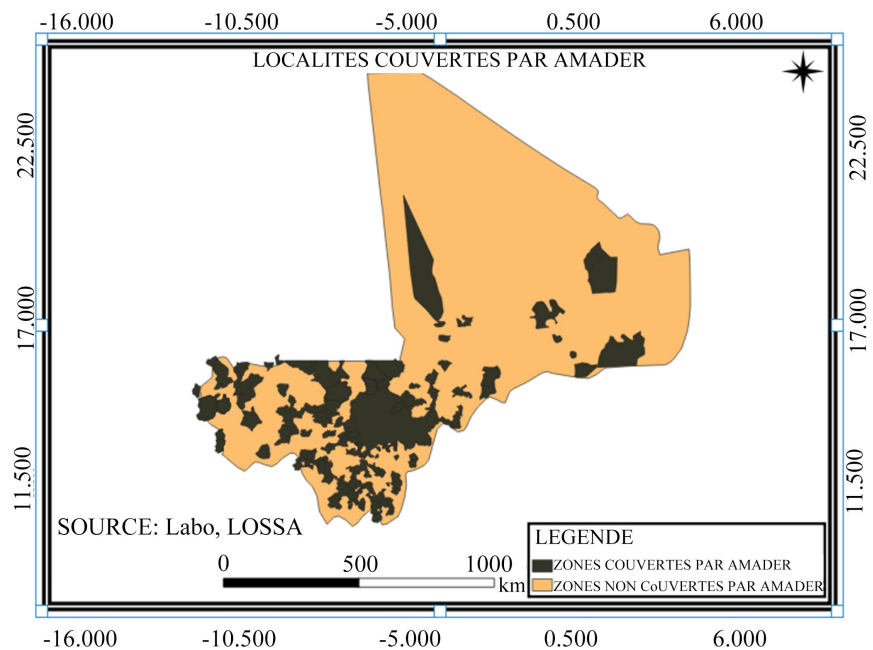


Figure 4. Municipalities served by AMADER.

According to **Figure 4**, a total of 117 municipalities colored in black are served by AMADER, representing 16.64% of the municipal territory.

3.1.4. Municipalities Served by Electrification Services

Table 5 shows the geographical distribution of all municipalities served by electrification services.

Table 5. Territorial coverage rate by electrification service.

Electrification service	Municipalities served	Percentage of territorial coverage
EDM-SA (Interconnected network + isolated centers)	70	10%
AMADER (decentralized electrification)	117	17%
Municipalities included in the EDM expansion plan	81	12%
Cumulative total	268	38%

Localities without electricity supply:

Figure 5 below shows the geographic distribution of the various communities served and not served by the national power grid.

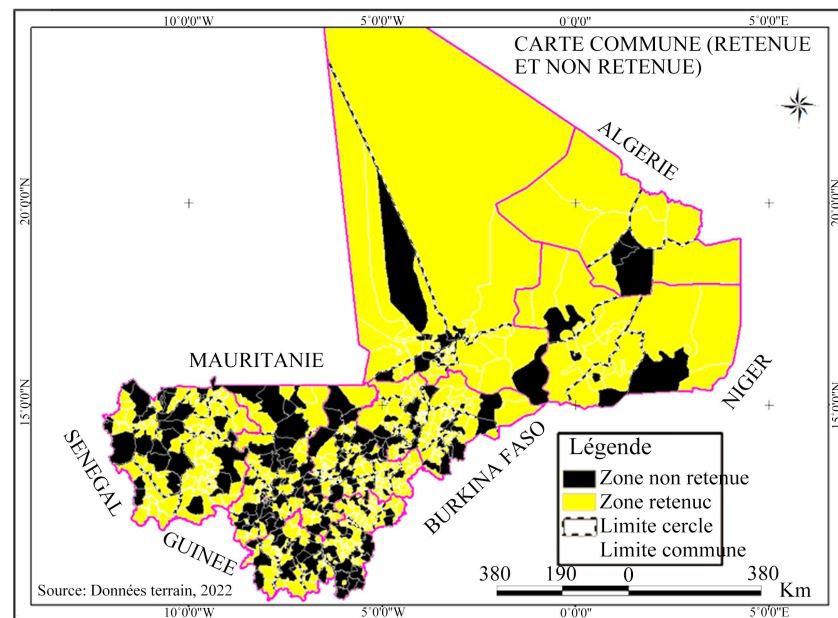


Figure 5. Territorial distribution map.

In **Figure 5** above, the area shaded in black represents the various municipalities that have access to a reliable electricity supply, totaling 268 municipalities. In contrast, the yellow-shaded area represents the various municipalities that do not have access to a reliable electricity supply, totaling 435 municipalities. However, the map shown in **Figure 6** below clearly illustrates the distribution of the various municipalities in Mali that are not connected to the electricity grid.

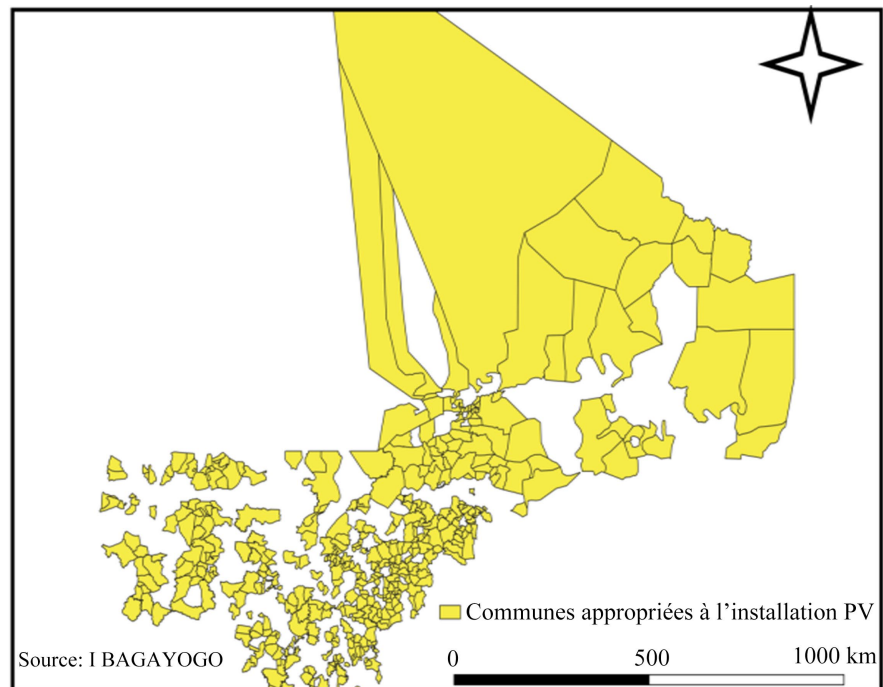


Figure 6. Municipalities not covered.

Figure 6 above shows the geographic distribution of the various municipalities that are not served by the national power grid. The area shaded in black corresponds to the 435 municipalities that do not have access to a reliable electricity supply.

3.2. Statistics on Access to Electricity in Mali

Figure 7 below shows the rate of access to electricity by locality through the interconnected network (RI). It can be seen that the district of Bamako dominates with access rates of 98.26% and 89.07%, depending on whether the population of the localities served alone or the total population is considered. On the other hand, regions such as Gao, Timbuktu, and Kidal have zero rates and therefore do not benefit from access to electricity through the interconnected network (RI).

Figure 8 shows the rate of access to electricity through isolated centers (CI). It can be seen that the regions of Mopti and Timbuktu lead the way with access rates of 39.81% - 8.14% and 38.94% - 11.76%, depending on whether only the population served or the total population is considered. In contrast, the district of Bamako has a zero rate through EDM's isolated centers.

Figure 9 below shows the rate of access to electricity in Mali through AMADER. It can be seen that the regions of Kayes and Sikasso have high rates of 26.9% and 8.1% and 28.9% and 5.2%, respectively, depending on whether only the population served or the total population is considered.

Figure 10 below shows the national access rate through the various electrification services, where we can see that Bamako has high rates of 98.26% and 89%. In contrast, the Mopti region has the lowest access rate at 12.64% and 10.34%.

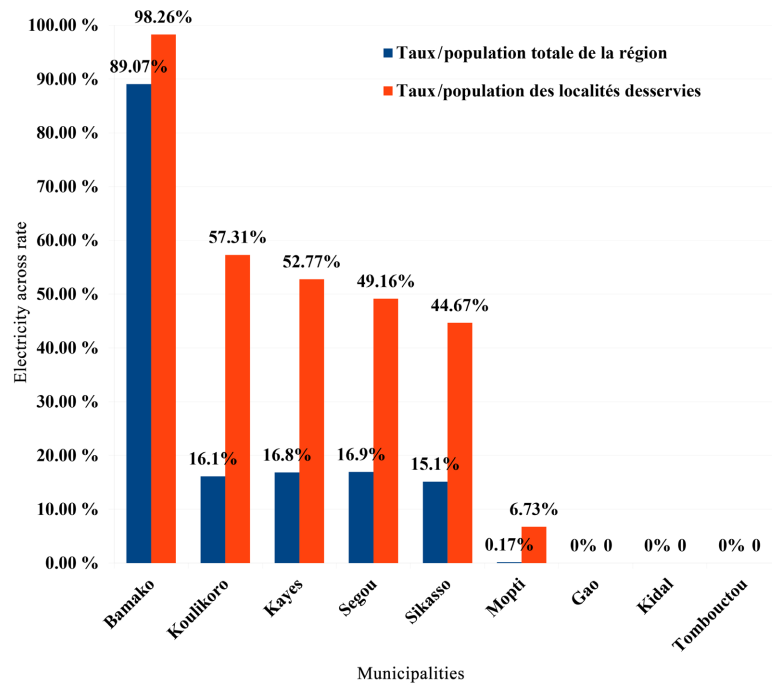


Figure 7. Electricity access rates across RI.

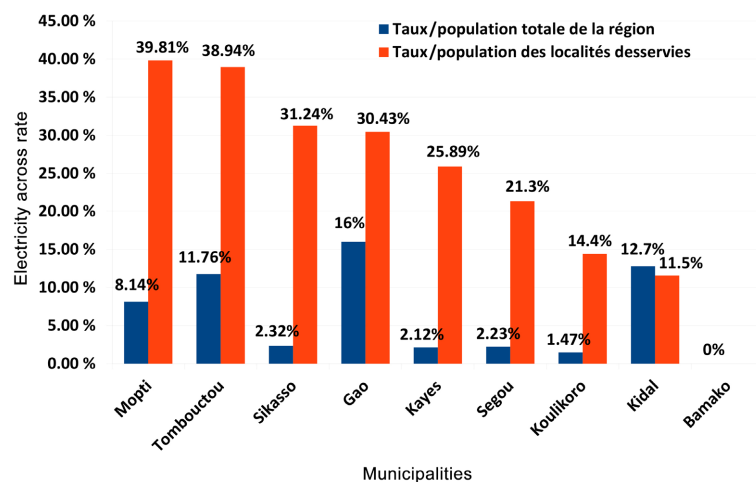


Figure 8. Access rates through CI.

The national average is 59.06% for the population served and 26.11% for the total population.

4. Discussion

Analysis of data on access to electricity in Mali reveals significant discrepancies between figures published by different national and international sources. This study highlights significant discrepancies between the results obtained from locally processed data and those reported by the National Energy Directorate (DNE), the World Bank (WB), the World Bank & Energy Progress partnership, and recent statistics from the African Development Bank [13].

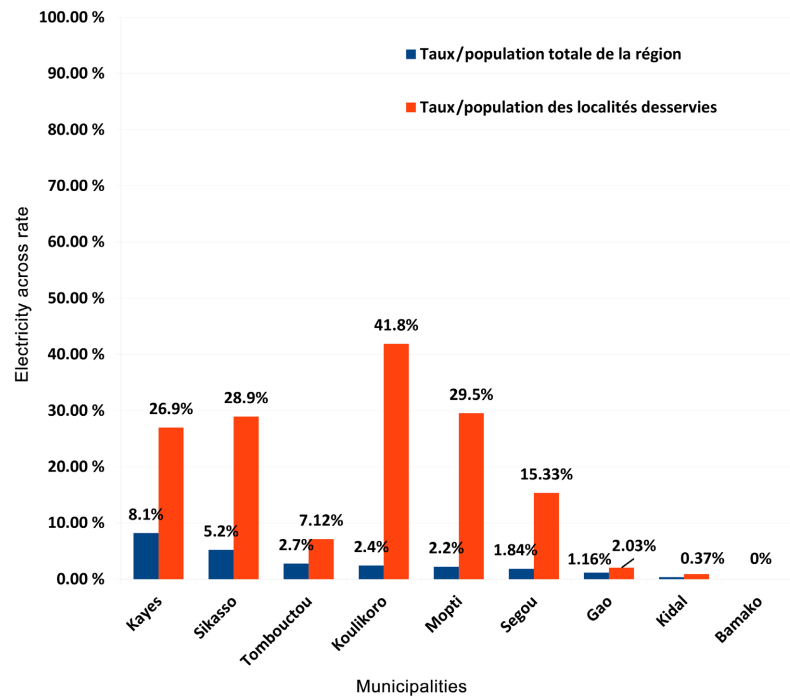


Figure 9. Access rates through AMADER.

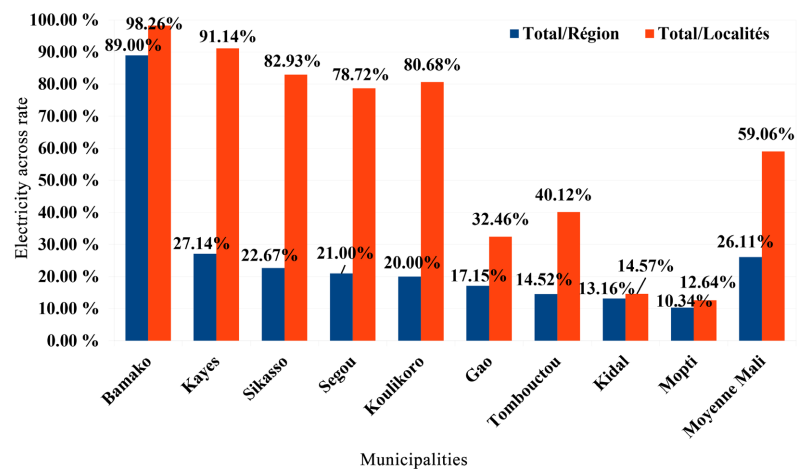


Figure 10. National access rate.

With regard to territorial electricity coverage, the results obtained from this study estimate that 38% of Mali's municipalities are covered by at least one EDM-SA, AMADER, or EDM expansion plan electrification service. In these localities where an electrification service exists, 58% of the population has access to electricity. However, the DNE indicates a rate of 53.6% in 2021 [14]. This discrepancy is mainly due to a difference in calculation methods. This study is based on a strictly territorial approach, considering the effective presence of at least one electrification service at the municipal level, while the DNE adopts an approach based on the theoretical distribution of the population, taking as a basis the capitals of the municipalities served, regardless of the geographical extent of coverage.

A comparison of these results suggests a modest increase in coverage rates over the years, but the methodology used by the DNE remains partially opaque, particularly with regard to the criteria for including localities or taking into account the population actually served. With regard to electricity access rates, this study proposes a dual methodological approach:

- On the one hand, a calculation based on the total population of the locality, resulting in a national access rate of 26.11%;
- On the other hand, an estimate based solely on the population of localities actually served, which gives a rate of 58%.

These results should be compared with the 51% put forward by the DNE in 2022. The observed discrepancy could be attributed not only to the methodology used (reference population, spatial scope), but also to the effect of population growth, which is not always updated uniformly in the various sources.

In addition, an independent survey conducted by Africa Check, “Mali: Is only 33% of the territory covered by electricity?”, questions the official figures [15]. This survey highlights a discrepancy between political statements and official data:

- The survey conducted by Africa Check-Mali (2022) cites a rate of 33%, which is much lower than that of the DNE (53.6% in the same year), also highlighting a divergence in approach between actual territorial coverage and potential access based on population.
- The World Bank & Energy Progress report (2020) indicates a rate of 50% - 51%, calculated based on household access to reliable sources of electricity [16].
- An older World Bank report (2008) reports a very low rate of 17%, based on the limited state of the electricity supply infrastructure at the time [17].
- Finally, AfDB statistics (2023) report an electricity rate of 56%, but explicitly distinguish between urban (87%) and rural (31%) areas [13], highlighting structural inequalities in access.

These discrepancies highlight three main factors of divergence: the measurement method, the scope of analysis, and the time frame, as the data refer to specific periods. Thus, this analysis shows that no methodological consensus seems to have been established to date for accurately and consistently assessing the actual rate of access to electricity in Mali. This complicates the development of targeted policies and the prioritization of investments, particularly in rural areas. It therefore appears necessary to promote the harmonization of statistical methodologies, taking into account both the territorial reality, existing infrastructure, and updated demographic data.

Furthermore, this study has certain limitations that should be noted. Indeed, the presence of an electricity service at the municipal level does not necessarily mean that the entire municipality is actually covered. In many cases, only the main town or an isolated center is electrified, while surrounding villages remain without access to electricity. This situation can therefore lead to an overestimation of the actual access rate, particularly when the analysis is conducted at the municipal level rather than at the level of individual localities or households.

5. Conclusions

A total of 703 municipalities, of which 268 are served and 435 are not served by electricity services, which equate to 38% and 62% territorial coverage, respectively.

In localities where electricity services exist, 59% of the population has access to electricity, according to the results of this study. However, the DNE indicates a rate of 58.6% in 2017, which is consistent with these data [18]. When calculated on the basis of the total population per locality, this rate decreases to 26%. This discrepancy is mainly due to a difference in calculation methods. This study is based on a strictly territorial approach, calculating the rate based on the population of the locality with access to electricity in relation to the total population of the locality, while the DNE adopts an approach based on the theoretical distribution of the population served, taking as a basis the main towns of the municipalities served, regardless of the geographical extent of coverage.

A comparison of these results suggests a modest increase in coverage rates over the years, but the methodology used by the DNE remains partially opaque, particularly with regard to the criteria for including localities or taking into account the population actually served.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Énergie du Mali-SA (EDM-SA). Rapport annuel d'activités EDM-SA 2022. <https://www.edmsa.ml/node/139432>
- [2] Global Solar Atlas. Global Solar Atlas. <https://globalsolaratlas.info/map>
- [3] IRENA (2019) Evaluation de L'état de Préparation aux énergies renouvelables. Mali, Agence internationale pour les énergies renouvelables.
- [4] DREI Mali. Mali: Atténuation des risques des investissements dans les énergies renouvelables. <https://www.undp.org/sites/g/files/zskgke326/files/2023-05/DREI%20Mali%20-%20Points%20Cle%CC%81s%20%28Mars%202023%29.pdf>
- [5] IRENA (2023) Evaluation de L'état de Préparation aux énergies renouvelables. Mali, Agence internationale pour les énergies renouvelables.
- [6] DNE (2019) Prospectus d'investissement de l'énergie durable pour tous SEforALL du Mali.
- [7] Cuenca, J.J., Daly, H.E. and Hayes, B.P. (2023) Sharing the Grid: The Key to Equitable Access for Small-Scale Energy Generation. *Applied Energy*, **349**, Article ID: 121641. <https://doi.org/10.1016/j.apenergy.2023.121641>
- [8] Trotter, P.A. (2019) A Low-Carbon Way to Increase Energy Access: How to Scale Mini-Grids in Developing Countries. SciSpace-Paper. <https://scispace.com/papers/a-low-carbon-way-to-increase-energy-access-how-to-scale-mini-uis8yzoelbw>
- [9] Bagayogo, I., Sanogo, S. and Traoré, I. (2025) Evaluation of the Solar Photovoltaic Potential for Electrification of Rural Areas off the National Grid in Mali. *Computational Water, Energy, and Environmental Engineering*, **14**, 77-96.

- <https://doi.org/10.4236/cweee.2025.142005>
- [10] Cissé, S. and Coulibaly, Y.S. (2012) 4ème recensement general de la population et de l'habitat du mali (RGPH-2009).
https://www.instat-mali.org/laravel-filemanager/files/shares/rgph/ra-mor09_rgph.pdf
- [11] Tryphena, B., C, P. and Vidhya, J. (2024) Enhancing Solar PV Deployment: Land Suitability Assessment and Site Selection Using AHP. 2024 *International Conference on Advances in Modern Age Technologies for Health and Engineering Science (AMATHE)*, Shivamogga, 16-17 May 2024, 1-6.
<https://doi.org/10.1109/amathe61652.2024.10582094>
- [12] Banque Mondiale & AIE (2015) Le point sur les objectifs d'énergie durable: Des avancées mais beaucoup reste à faire. World Bank.
<https://www.banquemondiale.org/fr/news/press-release/2015/05/18/new-report-finds-world-progressing-on-sustainable-energy-goals-but-still-far-from-finish-line>
- [13] AfDB (2015) Energies Renouvelables en Afrique: Profil pays du Mali.
<https://www.afdb.org>
- [14] Bagayogo, B. (2021) Note on Electrification Rates (Mali)|PDF. Scribd.
<https://fr.scribd.com/document/962460489/Note-Indicateurs-Taux-d-Electrification-Mali>
- [15] Africa Check (2022) Mali: Seulement 33 % du territoire est-il couvert en électricité?
<https://africacheck.org/fr/fact-checks/articles/mali-seulement-33-du-territoire-est-il-couvert-en-electricite>
- [16] Blimpo, M.P. and Cosgrove-Davies, M. (2020) Accès à l'électricité en Afrique subsaharienne.
<https://documents1.worldbank.org/curated/en/659361618462514281/pdf/Electricity-Access-in-Sub-Saharan-Africa-Uptake-Reliability-and-Complementary-Factors-for-Economic-Impact.pdf>
- [17] Saavedra, M., Linder, R. and Simmonds, D. (2014) Accès à l'énergie et sécurité énergétique en Afrique de l'Est.
https://archive.uneca.org/sites/default/files/PublicationFiles/energy_access_and_security_in_ea_fre_1.pdf
- [18] Sougane, A., *et al.* (2024) Consommation, pauvreté et bien-être des ménages.
https://instat-mali.org/laravel-filemanager/files/shares/eq/ranuel23_eq.pdf