EU Global Technical Assistance Facility (TAF)
for the Sustainable Energy

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Integrated Reference Continental Demand Forecasts

The **Continental Power System Masterplan (CMP)** was initiated in 2019, following a decision of the African Energy Ministers to serve as a blueprint for the **African Single Electricity Market (AfSEM)**.

The CMP assignment, developed under the coordination of AUDA-NEPAD with support from the European Union - Global Technical Assistance Facility (EU-GTAF), will identify all the key priority generation and transmission projects (physical or "hard" infrastructure) which are crucial for the realization of the AfSEM.

The CMP assignment is split into 2 parts:

1. Baseline study (2019-2020)
2. Modelling and planning of CMP (2021-2023)

The synergy and complementarity of the AfSEM and CMP assignments will ensure that efficient generation facilities and resilient electricity interconnections will support adequate and efficient market-based mechanisms for trading.

Reference continental demand forecasts

OBJECTIVE

Develop the reference case integrated continental demand projections (GWh and MW) for the CMP planning horizon (2021-2040) based on a common methodology and guided by the power pools' historical demand, which will lead to identifying the key priority CMP infrastructure which is crucial for the realization of the AfSEM

METHODOLOGY

Econometric studies; Extensive consultative and participatory process; Use of the common modelling tool (EViews software); Capacity building.

THE ECONOMETRICS APPROACH

The study used this quantitative approach to establish a relationship between the dependent variables (GWh and MW) and the chosen independent variables (demand drivers) through the statistical analysis of historical data. With the right selection of demand drivers and their combinations, empirical best-fit relationships were established between the demand forecasts and historical demand drivers. This enabled the power pools and their member utilities to have a better understanding of the relationships between the demand drivers and their impact on future demand projections.

The importance of robust demand forecasts

For the priority power generation and transmission "hard" infrastructure to be identified, robust demand forecasts are very crucial. Inaccurate demand forecasts can lead to poor power system planning and operations as well as the wrong prioritization of generation facilities and transmission interconnections for investment.

By using a **common tool and a consistent approach** to model the evolution of the electricity (energy and peak) demand for each African country, the CMP demand forecast methodology ensures a strong uniformity and convergence in the results, which is essential to foster cooperation on regional and continental energy infrastructure projects. This has further enhanced the process for selecting the priority generation and transmission projects under the CMP.

Demand drivers

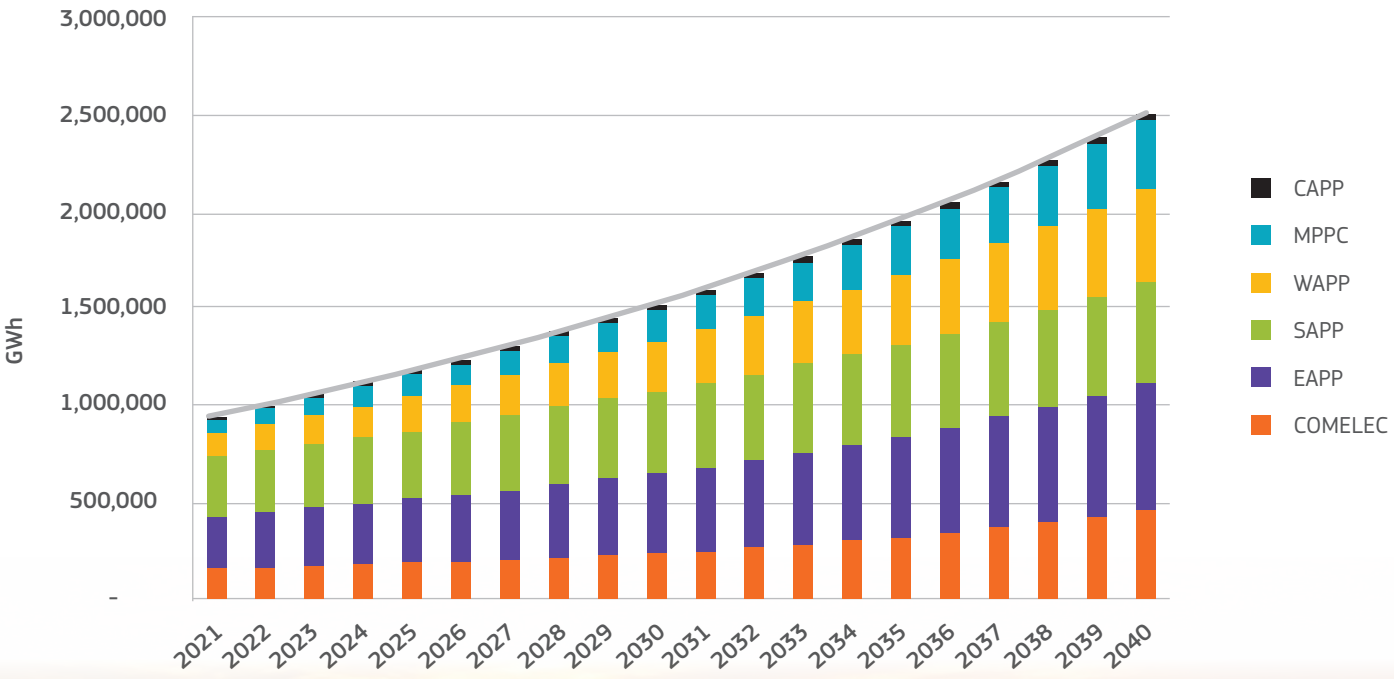
What are the key parameters that will drive future energy demand in Africa?

GDP per capita
Electricity Consumption per capita
Urbanisation Rate
Electricity Access
Population

Power Pool or Country Grouping	Demand drivers selected from regression analysis
SAPP	Population, Urbanisation rate, Electricity Access, Electricity Consumption per capita, GDP per Capita
EAPP	GDP per capita, Electricity Consumption per capita, Urbanisation rate, Electricity Access, Population
COMELEC	Electricity Consumption per capita, GDP per capita, Urbanisation rate
CAPP	Population, Urbanisation rate, Electricity Consumption per capita, GDP per capita, Electricity Access
WAPP	GDP per capita, Urbanisation rate, Electricity Consumption per capita, Electricity Access
Multi-power pool countries (MPPC)	GDP per capita, Electricity Access, Electricity Consumption per capita, Urbanisation rate, Population

Electricity demand projections (GWh)

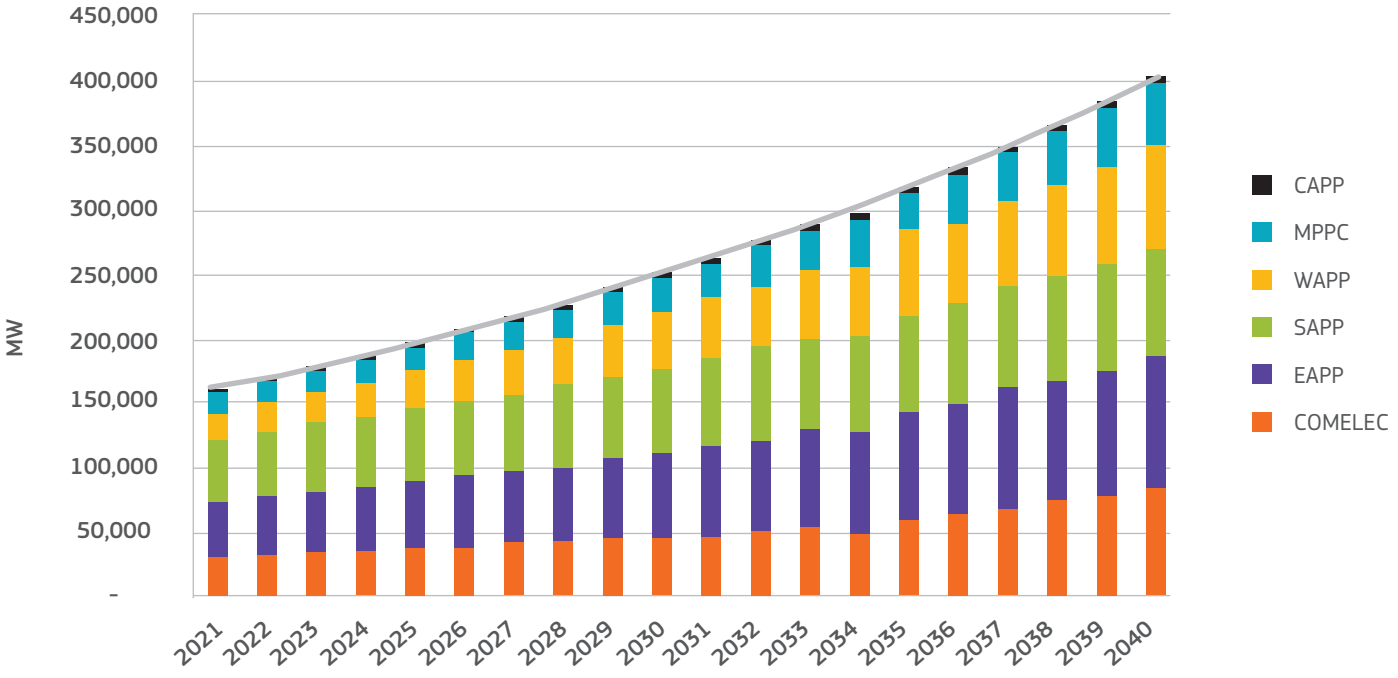
As per the forecast results, electricity demand (TWh) for Africa will increase from 941 TWh in 2021 to 2,504 TWh in 2040, representing an average annual growth rate of 5.3% over the entire CMP planning period.



Peak demand projections (GW)

It is projected that peak demand will increase from 162 GW in 2021 to 405 GW in 2040 across Africa, representing an average annual growth rate of 5.0% over the entire CMP planning period.

Power Pool or Country Grouping	2021 (MW)	2025 (MW)	2030 (MW)	2035 (MW)	2040 (MW)
CAPP	2,449	3,003	3,844	4,934	6,359
COMELEC	30,313	36,110	45,642	59,850	84,025
EAPP	44,766	53,123	66,542	83,234	102,919
SAPP	48,560	56,094	65,464	74,503	84,535
WAPP	20,585	29,357	42,840	59,437	79,299
Multi-power pool countries (MPPC)	14,984	19,460	26,688	35,839	47,946
Africa	**161,658**	**197,148**	**251,020**	**317,797**	**405,082**



The level of detail offered by this study allows a comprehensive analysis of the demand drivers for each country, by establishing empirical relationships between the demand forecasts and the key socio-economic and demographic variables for each country.

This approach will further lead to equitable investment decisions to enhance Africa's socio-economic development and consumer benefits, through enhanced accessibility and affordable electricity prices.

Due to the uncertainty inherent in electricity demand forecasts, three further scenarios were further applied to explore the impacts on economic growth and energy access that will guide the power pools and their member utilities to make efficient and right infrastructure investment decisions to be able to supply the growing demand.