WEST AFRICAN REFINING INDUSTRY AND MARKETS

(Version française disponible)

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Major shifts are undergoing in the West African petroleum products market :

- Regulatory changes with new AFRI-5 norms shall imply important adaptation investments;
- Refining installed capacity is doubling, mainly driven by Nigeria with a potential overcapacity in West Africa;

→ **What future for the small refineries in the region (<5MT[1]) ? Make the required industrial investments or strengthen their importation capabilities of refined products ?**

Installed capacity evolution

- In 2020, the installed capacity in West Africa is estimated at **28 MT[1]** of which **20 MT** located in **Nigeria.**
- In 2025, this capacity will more than double to reach **61 MT** with new processing plants in Nigeria (Dangote, +25 MT), in Ghana (Takoradi, +6 MT) et in Senegal (SAR 2.0, +2 MT) → *Possible overcapacity in the region depending on the CU[2] reached in Nigeria.*

Regulatory trends : AFRI-5 standards

- **ECOWAS** decided to apply standardized **new specifications AFRI-5** which limit Sulphur content in produced diesel and gasoline to 50 ppm (EURO-6 equivalent) following a meeting between **ministries of hydrocarbons** from different State members in February 2020.
- A request has been made to **ECOWAS commission** to pass these new specifications through **directives**.

Production and demand evolution

- In 2020, the **6 MT** production only covered 15% of the 41 MT demand of the region; exacerbated by the **Nigerian paradox[3]**.
- In 2025, demand should reach **51 MT.** It may be slightly less less depending on the penetration of alternative fuels such as natural gas.
- Until 2025, oil products production should be slightly below the demand.

Implications for countries/refineries

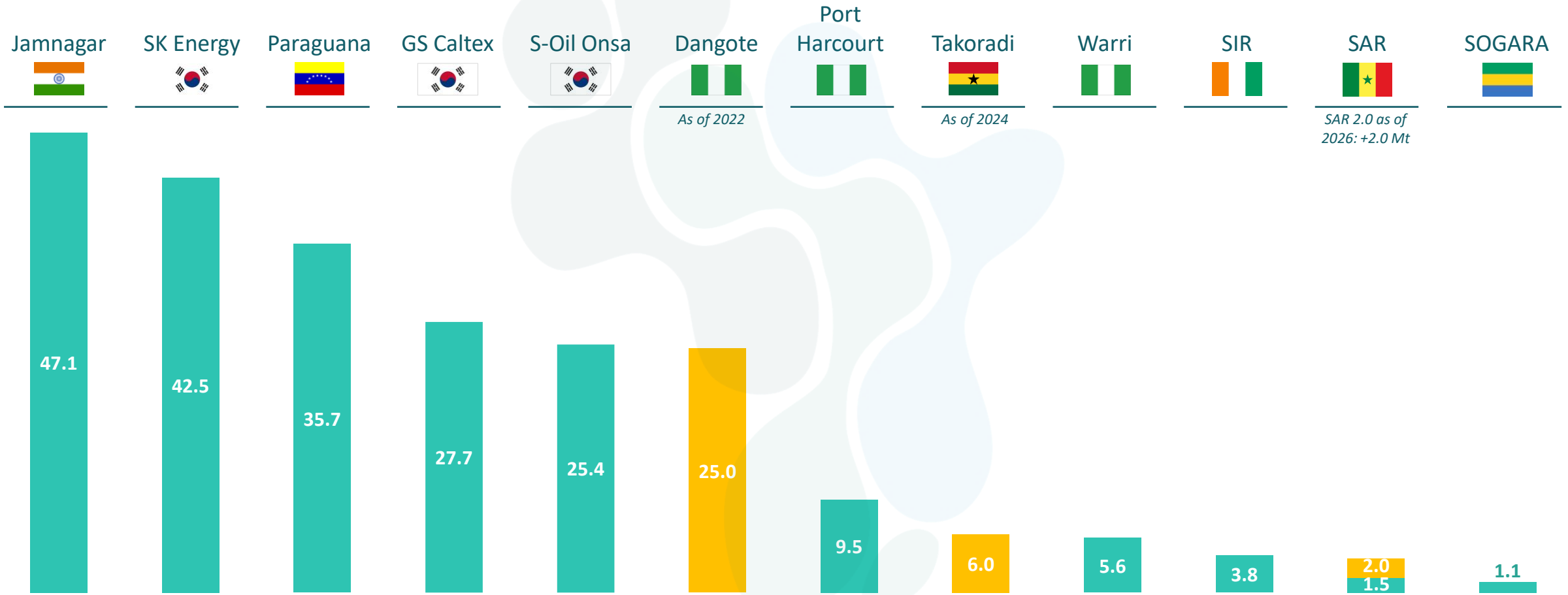
- The introduction of new AFRI-5 norms involves **new investments** on existing plants to remain compliant.
- The significant capacity increase in the ECOWAS region raises the question of the **optimum** between pursuing investments in small, less competitive refineries vs. focus on importations. This economic optimum will take into account local crude oil productions and sovereignty concerns.

(1) Millions of tons (2) Capacity Utilization (3) Nigerian paradox: Crude oil production of ~80-90 Mt/year, 20 Mt/year refining capacity, yet 20 Mt/year importations

Sources : A&A Strategy analysis et estimations

- **World Top 5** refineries is dominated by **Asian** players particularly from India and South Korea.
- **West African refineries** are relatively small excepted **Dangote's** which should be commissioned in 2022 and join world top 10.

OVERVIEW OF GLOBAL AND WEST AFRICAN REFINERIES (INSTALLED CAPACITY IN MILLIONS OF TONS, 2021)



Sources : : A&A Strategy analysis et estimations

- Among the 16 countries within the ECOWAS + Mauritania, only **5** should own operating refineries by 2026 with a total installed capacity estimated at **61 millions of tons per year**.
- The Capacity utilization of the Nigerian refineries remains unclear as billions of dollar of investments are required.

WEST AFRICAN REFINING CAPACITIES CARTOGRAPHY BY 2026

SENEGAL

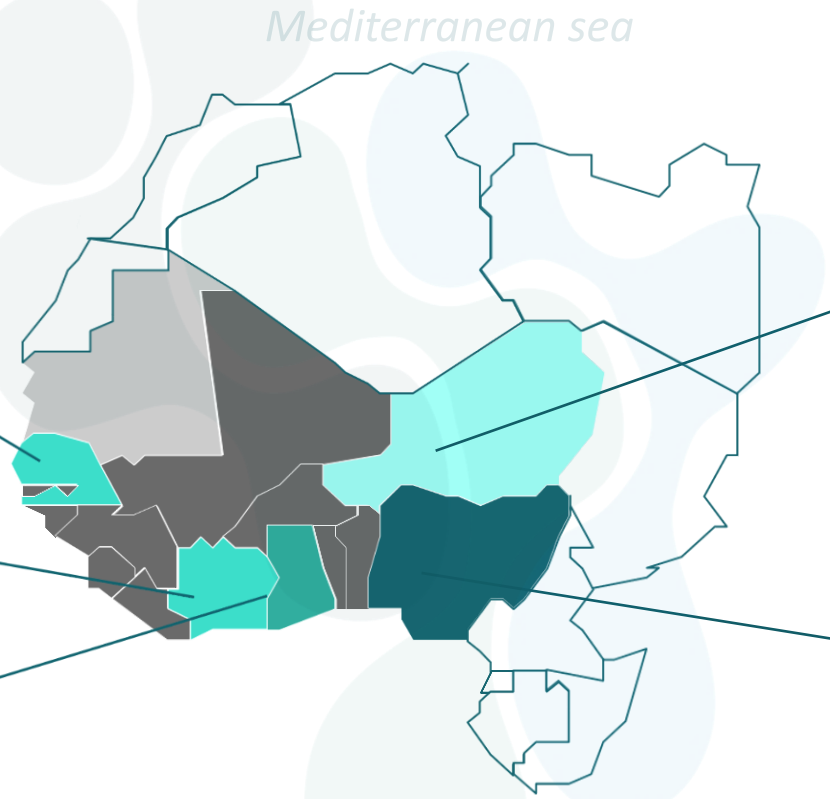
Refinery	Capa* (Mt/year)
SAR	1.5
*SAR 2.0***	*+2.0*

IVORY COAST

Refinery	Capa* (Mt/year)
SIR	3.8

GHANA

Refinery	Capa* (Mt/year)
TEMA	2.0
*Takoradi***	*6.0*



NIGER

Refinery	Capa* (Mt/year)
ZINDER	1.0

NIGERIA

Refinery	Capa* (Mt/year)
Port Harcourt	9.5
Warri	5.6
Kaduna	5.0
Dangote**	25
Waltersmith	1.5
Yenagoa	0.6

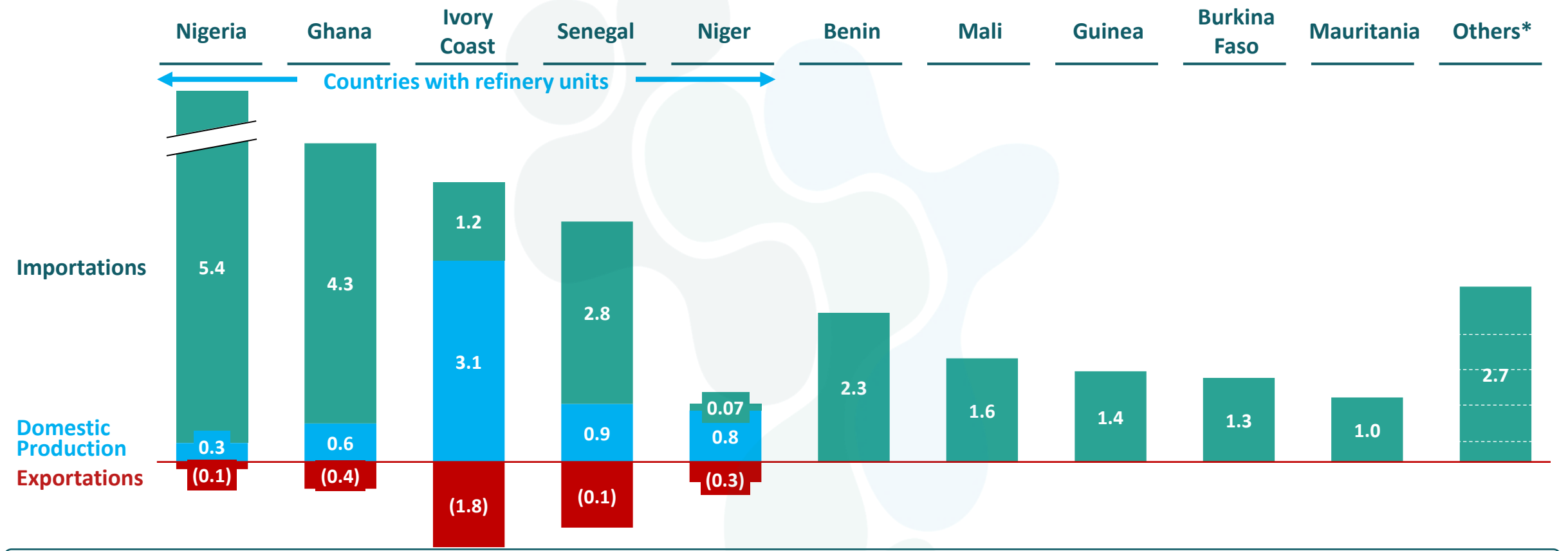
* Installed capacity in 2021

** Planned in 2026

Sources : A&A Strategy analysis et estimations

- Demand of petroleum products is mainly covered by importations for all west African countries (ECOWAS + Mauritania) excepted **Ivory Coast**.
- ***« The Nigerian paradox »***: significant crude oil producer with an important installed refining capacity; yet almost the whole consumption is imported as the refineries are shut down for revamping

PETROLEUM PRODUCTS DEMAND COVERAGE PER COUNTRY (MILLIONS OF TONS, 2019)



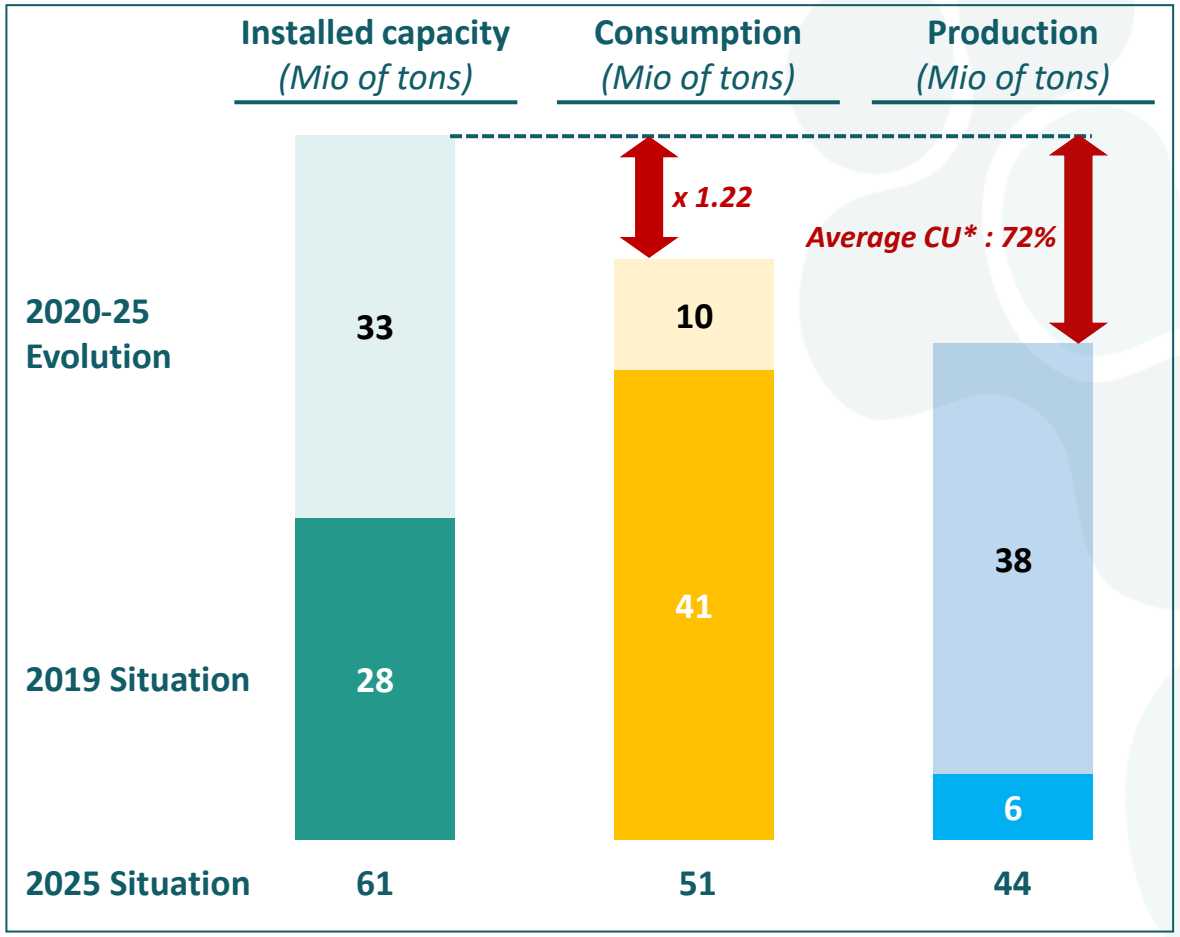
Total (Mt)	20.5	4.5	2.5	2.7	0.6	2.3	1.6	1.4	1.3	1.0	2.7*

*Other importing countries : Cape Verde (0.5 MT), Sierra Leone (0.4 MT), Gambia (0.3 MT), Liberia (0.4 MT), Togo (1.0 MT), Bissau Guinea (0.1 MT)

Sources : A&A Strategy analysis et estimations ; CITAC; 2019 ANSD Foreign Trade note;

In 2025, the West African region should be in **overcapacity** compared to demand depending on the smooth roll-out of Dangote's refinery and the restart of idle Nigerian refineries owned by NNPC.

Consolidated petroleum products demand coverage by 2025 within West Africa**



*CU = Capacity Utilization ** ECOWAS + Mauritania

Potential overcapacity by 2025 in West Africa depending on Nigerian refineries' trends

- The refining installed capacity within the ECOWAS + Mauritania is estimated at 61 Millions of tons per year by 2025 vs 28 Millions of tons in 2019; that is a 118% increase driven by :
  - The new Dangote refinery in Nigeria (25 Millions of tons per year)
  - The new Takoradi refinery in Ghana (6 Millions of tons per year)
  - And the capacity increase of SAR in Senegal (from 1.5 to 3.5 Millions of tons per year)
- Demand is estimated at 51 Millions of tons by 2025 → **Potential overcapacity.**
- Production by 2025 should reach around 44 Millions of tons in a scenario of an on-time commissioning of Dangote refinery and the return to production of the other main Nigerian refineries as per currently stated plans.

Sources : A&A Strategy analysis et estimations

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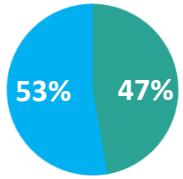
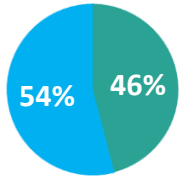
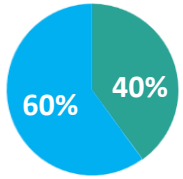
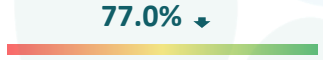
- **SIR** in Ivory Coast with **3.8 Millions of tons** installed capacity and 81.6% Capacity Utilization outperforms other West African refineries.
- **SAR** in Senegal, following its capacity increase project **SAR 2.0** is expected to reach **3.5 Millions of tons** per year to cover a large part of the domestic demand and process the Sangomar (SN) crude oil.

WEST AFRICAN REFINERIES SITUATION (1/2)

Refineries	Ownership Private / Public	Installed Capacity (MT)	Capacity Utilization 2020	Crude oil storage capacity (m^3)	Construction date and current status
SIR (Ivory Coast)		**3.8**		650 000	• *Built in **1962*** • *Highest Capacity Utilization amongst Sub-Saharan African countries*
TOR (Ghana)		**2.0**		455 000	• *Built in **1963*** • *Unsteady production and low capacity utilization due to repetitive technical incidents (fire)*
SAR (Senegal)		**1.5** (3.5 as of 2026)		212 000	• *Built in **1963*** • *Decreased Capacity Utilization in 2020 due to 3 months crude oil shortage.*
ZINDER SORAZ (Niger)		**1.0**		80 000	• *Built in **2011*** • *Overcapacity with a refinery producing x1.4 the domestic demand and exporting its excess production mostly to Nigeria.*

Sources : Africa Downstream Database, Financial and operations report November 2020; A&A Strategy analysis et estimations

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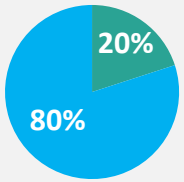
- Main Nigerian refineries, all **idle** to date, have had **low capacity utilizations** driven by low spending on **maintenance** of the plants and deterioration of the **pipelines**. Significant investments are required for restart.
- **Dangote** refinery to be commissioned in 2022 should cover a large portion of Nigerian domestic demand.

WEST AFRICAN REFINERIES SITUATION (2/2)

Refineries	Ownership Private / Public	Installed Capacity (MT)	Capacity Utilization 2020	Crude oil storage capacity (m^3)	Construction date and current status
Port Harcourt PHRC (Nigeria)		**9.5**	0.0% (src: NNPC)	465 560	• ***Idle refineries in 2020 and probably through 2021 :*** *high level of corrosion and deterioration on pipelines over the past few years* • ***Significant investments (USD 5-6 Billions)*** *are required to modernize the 3 refineries* • *The federal government is exploring the* ***privatization*** *option for all 3 refineries.*
WARI REFINERY (Nigeria)		**5.6**	0.0% (src: NNPC)	290 700	
KEDUNA REFINERY (Nigeria)		**5.0**	0.0% (src: NNPC)	468 800	
DANGOTE LEKKI (Nigeria)		**25.0**	0.0% (Mise en service 2022)	N.A	• *Production meets* ***100% of Nigerian domestic demand*** *and enables exportations to West Africa (depending on the yield)*

Sources : Africa Downstream Database, Financial and operations report November 2020; A&A Strategy analysis et estimations

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