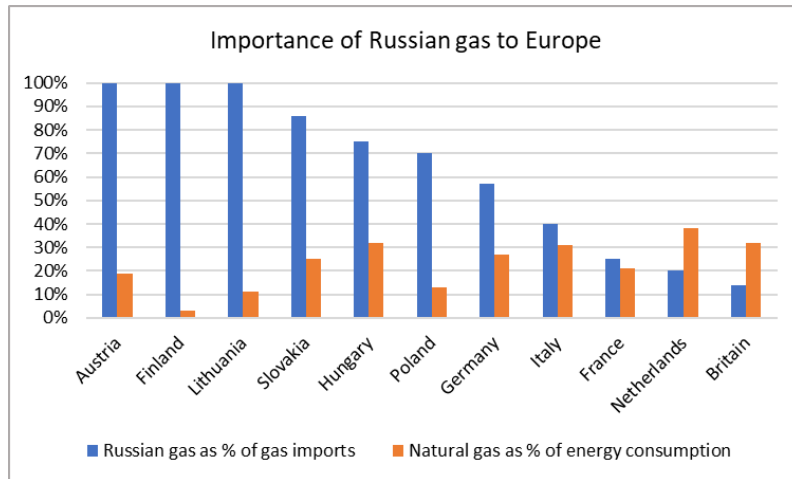


A view from the ground along the proposed Trans-Saharan Gas Pipeline (TSGP) route

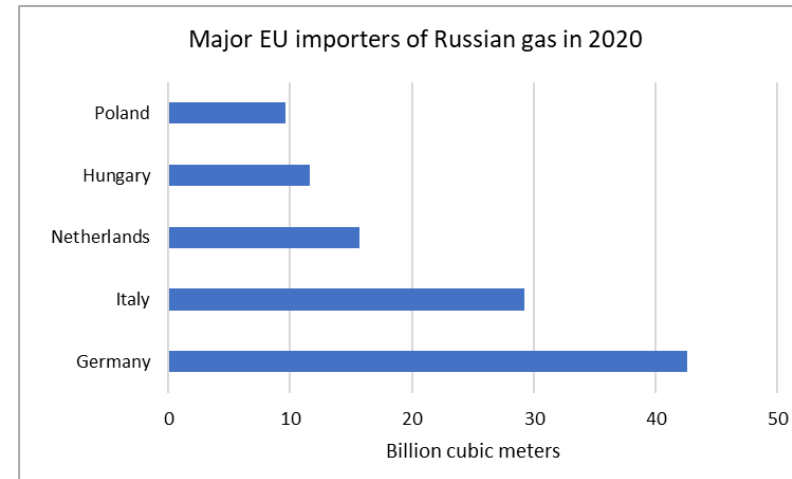
By Baba Freeman

Abstract: The proposed Trans-Sahara Gas Pipeline (TSGP) has been conceived to transport gas from the Niger delta in Nigeria, across Niger and Algeria to supply Europe as it reduces its dependence on Russian gas while transitioning to lower carbon energy. Natural gas is a key component of several European countries' total energy consumption and the push to diversify the provenance of their gas supplies would reduce market risks associated with the proposed TSGP. Technical risks to the pipeline's success can also be substantially mitigated through engineering studies before the final investment decision is made. This commentary makes the case that beyond these latter risk categories, there would be residual risks to the TSGP's success that are non-market and non-technical in nature. It highlights some of these residual risks and proposes potential mitigation strategies.

Europe needs to reduce its dependency on gas from Russia



Data from: The Economist, "How will Europe cope if Russia cuts off its gas?" 01/29/2022.

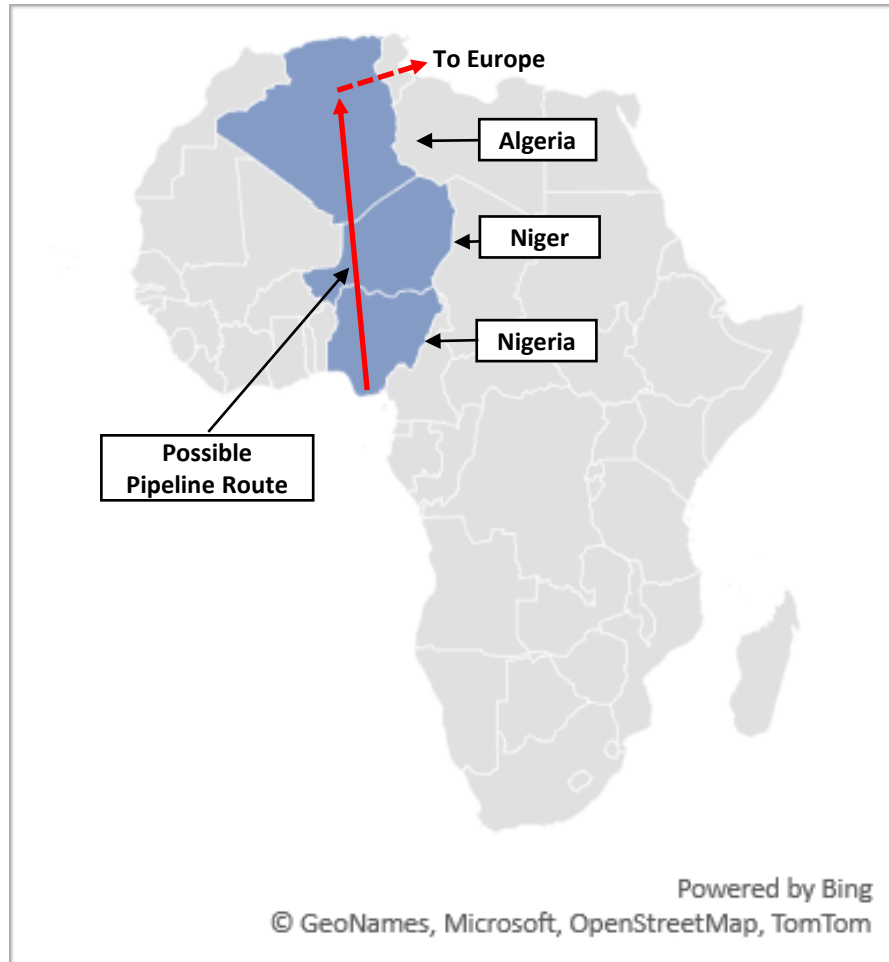


Data from: BBC, "Russia sanctions: Can the word cope without its oil and gas?", 05/31/2022.

- Natural gas imports are of great strategic importance to several EU countries, it contributes more than 20% of total energy consumed.
- Russia supplies ~40% of the EU's natural gas.¹ In some countries e.g., Austria and Lithuania, it supplies 100% of imports.
- To reduce imports of Russian gas by 50%, five large EU importers of Russian gas must source ~54 billion cubic meters/year of natural gas from non-Russian sources.²
- USA, Australia and Qatar dominate global LNG supply and their future output is largely contracted to existing customers.
- The proposed Trans-Sahara Gas Pipeline (TSGP) can help meet the coming European gas shortage if its development would precede other competing sources.

¹BBC, "EU reveals its plans to stop using Russian gas", 05/18/2022. ²Germany, Italy, Netherlands, Hungary and Poland.

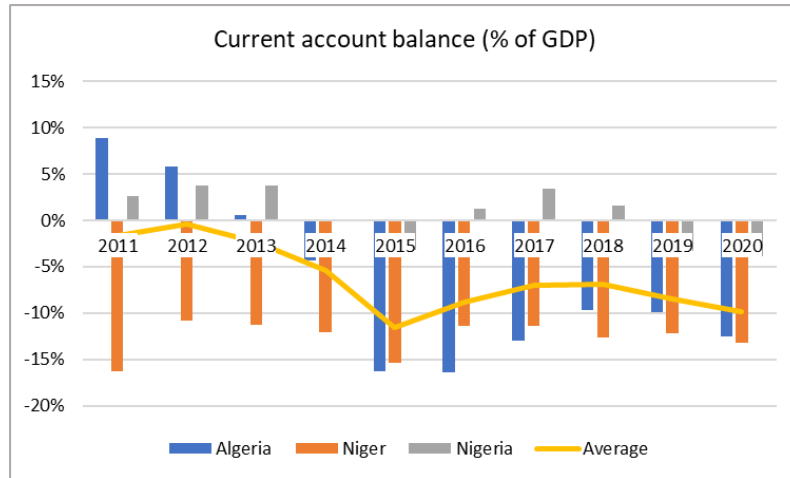
The proposed TSGP can help diversity Europe's gas supply



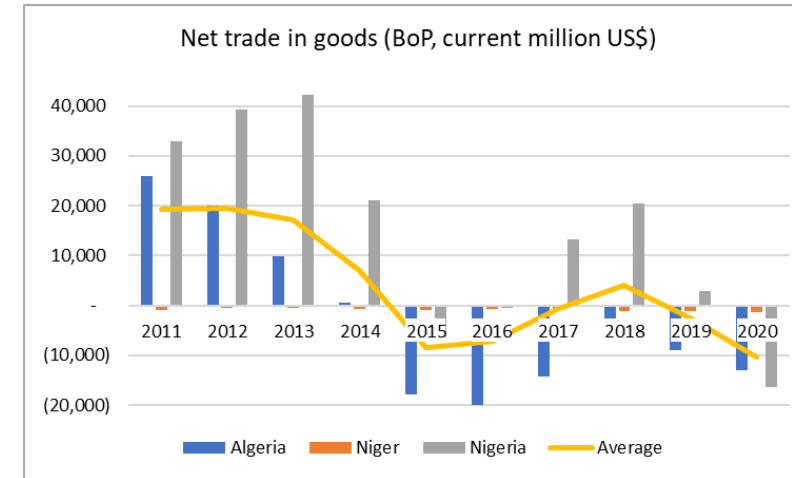
- The proposed pipeline would carry gas from Warri, Nigeria, through Niger, to Hassi R'mel, Algeria.
- Target market: Europe.
- Distance: 2,565 miles¹ (4,128km).
- Estimated cost: ~\$13bn.¹
- Annual volume: 30 million cubic meters.¹
- Promoters: Host governments, African Union (AU) Programme for Infrastructure Development in Africa.
- Intergovernmental agreement signed in 2009, yet to be ratified.
- Project start date not specified.

¹ Al Jazeera, "Algeria, Niger, Nigeria resume talks on Trans-Saharan gas pipeline." 06/23/2022.

TSGP host countries stand to benefit substantially from its success



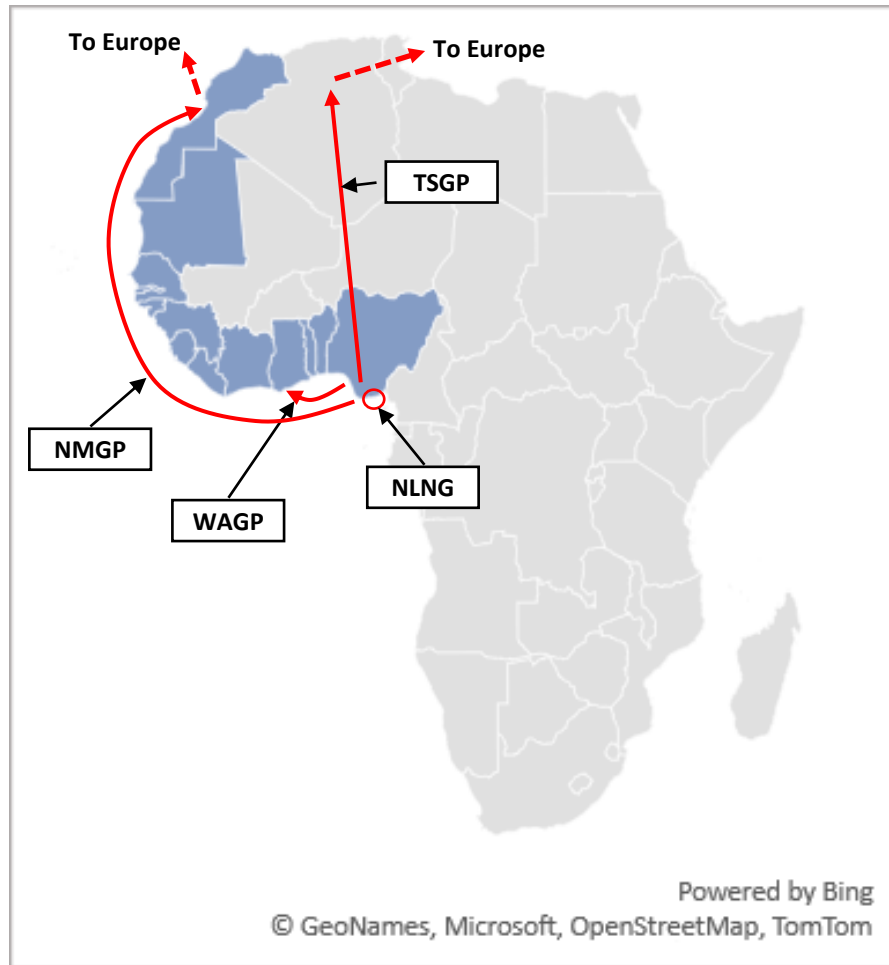
Data from: <https://data.worldbank.org/>



Data from: <https://data.worldbank.org/>

- Reverse adverse macroeconomic trends
 - Increase foreign currency earnings, reduce current account imbalance and trade deficits.
 - Deploy new royalties, taxes and tariffs from gas production and transportation to lower fiscal deficits.
- Increase level of commercial activity and industrialization
 - Attract investment by minimizing greenfield project risk related to energy (and possibly feedstock) availability.
- Reduce energy poverty
 - Improve energy quality and availability by reducing occurrence of blackouts and brownouts.
 - Displace expensive onsite diesel power generation and augment hydropower generation when water levels are low.
- Enhance corporate social impact
 - Create direct (e.g., gas plant operators, mechanics) and indirect work opportunities.
 - Mitigate social vices associated with chronic unemployment and underemployment.

But the TSGP could face substantial regional competition



- Nigeria LNG (NLNG)¹
 - Train 7 gas liquefaction plant is under construction.
 - Capacity: ~7.6 million metric tonnes per annum (4.2 million from the new Train 7, and 3.4 from operational improvements).
 - Estimated cost: \$6.5bn + ~\$5bn for supporting wells and infrastructure.
 - Markets: International. (Predominantly Europe).
 - Ownership model: Public-private JV
- West African Gas Pipeline (WAGP)^{2,3}
 - Operating since 2011, sometimes under force majeure conditions.
 - Capacity: 170mmscfd (initial), 460mmscfd (at peak).
 - Markets: Benin, Togo, Ghana.
 - Ownership model: Public-private JV.
- Nigeria-Morocco Gas Pipeline (NMGP)⁴
 - In proposal stage, financing for front end engineering design secured.
 - Capacity unspecified, may become an extension of WAGP.
 - Estimated cost: ~\$25bn.
 - Markets: Morocco, Europe, coastal ECOWAS countries.⁵
 - Ownership model unspecified. Promoted mainly by Morocco with support from the Islamic Development Bank.

¹ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/122719-nigerias-lng-capacity-to-grow-by-35-with-train-7>. ² <https://www.wagpc.com/wagp/>. ³ Mike Fulwood, "Opportunities for Gas in Sub-Saharan Africa", Institute for Energy Studies, 2019. ⁴ Jon Marks, "King Mohammed VI's pipe dreams.", The Africa Report No. 118. January-February-March 2022. ⁵ ECOWAS is the Economic Community of West African States.

The TSGP also faces other risks

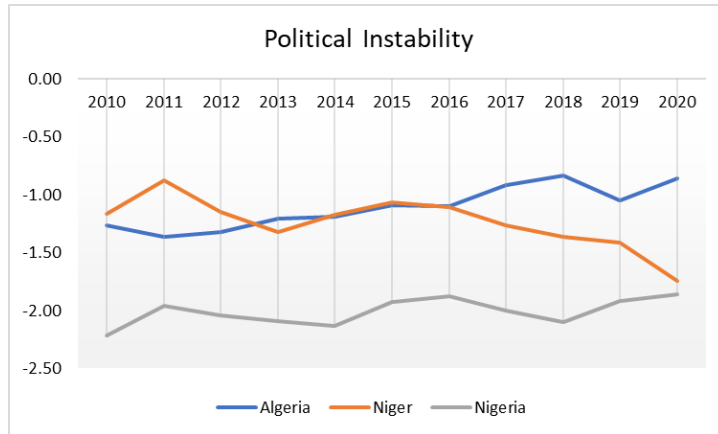
- Technical risks are likely to be finite and manageable:
 - Pipeline technology is not recent, pipelines have been built under challenging conditions and in demanding environments like deserts, marine, and sub-arctic areas.
 - Subsurface risks relating to the sufficiency of gas reserves must be addressed considering competing pipeline projects.
- Market risks are mainly related to the ease of accessing gas markets under commercially viable terms:
 - Europe's urgent need to diversify its energy sources and lessen dependence on Russian gas will help mitigate demand risk.
 - Broad support in Europe for decarbonization of the electric power generation will also boost future demand for gas.
- Technical and commercial feasibility studies will highlight both technical and market risks and influence the “go”/“no-go” or final investment decision.
- **However, non-technical and non-market risks are likely to persist and grow as substantial financial resources are committed and project promoters have less room to maneuver.**

Some key indicators for assessing non-market and non-technical risk

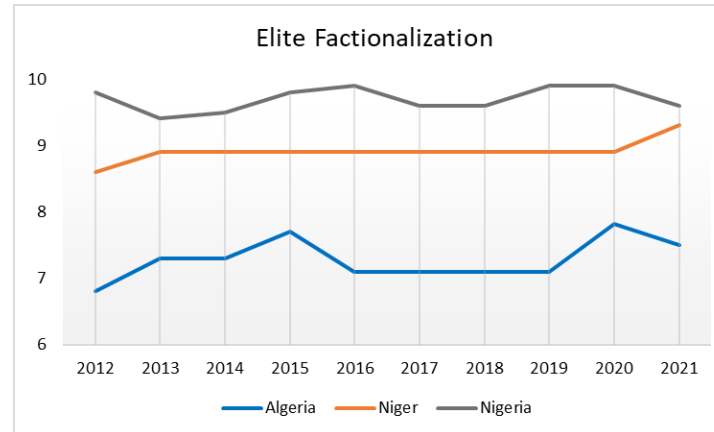
Metric	Range	Description	Source
Political stability / Absence of Violence.	-2.5 (weak) to +2.5 (strong).	“Perception of the likelihood of political instability and /or politically motivated violence.” ¹	The World Bank, Worldwide Governance Indicators.
Ease of doing business score.	0 (worst) to 100 (best).	A measure of institutional attitudes towards investors and business in general.	The World Bank, Doing Business Report. ²
Elite factionalization.	0 (good) to 10 (bad).	Reflects the level of unity of elite factions that control key institutions.	Fund for Peace, Fragile States Index.
Violent conflict probability.	0 to 100%.	Probability of violent conflict in a jurisdiction.	European Commission, INFORM Global Risk Index.
Youth male unemployment. Ages 15-24.	0 to 100%.	Share of males aged 15 to 24 without jobs but seeking employment.	The World Bank.
Demographic pressure.	0 (good) to 10 (bad).	Population pressures on the state in relation to food and water supply, “and other life-sustaining resources”. ³	Fund for Peace, Fragile States Index.

¹ The World Bank, GovData360, https://govdata360.worldbank.org/indicators/hb0673e03?country=BRA&indicator=376&viz=line_chart&years=1996,2020. ² Discontinued in September 2021. ³ Fund for Peace, Fragile States Index, <https://fragilestatesindex.org/indicators/s1/>

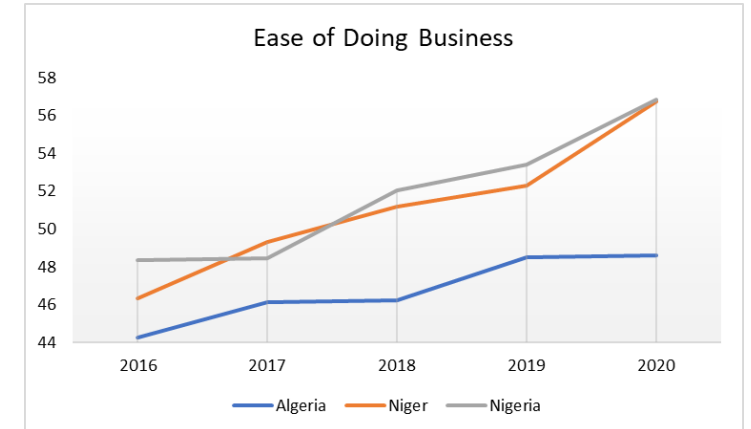
The view from the ground along the TSGP route



Data from: The World Bank, World Governance Indicators
<http://info.worldbank.org/governance/wgi/#home>



Data from: Fund for Peace, <https://fragilestatesindex.org/excel/>



Data from: The World Bank, <https://www.worldbank.org/en/programs/business-enabling-environment/doing-business-legacy>

- Political instability and elite factionalization¹

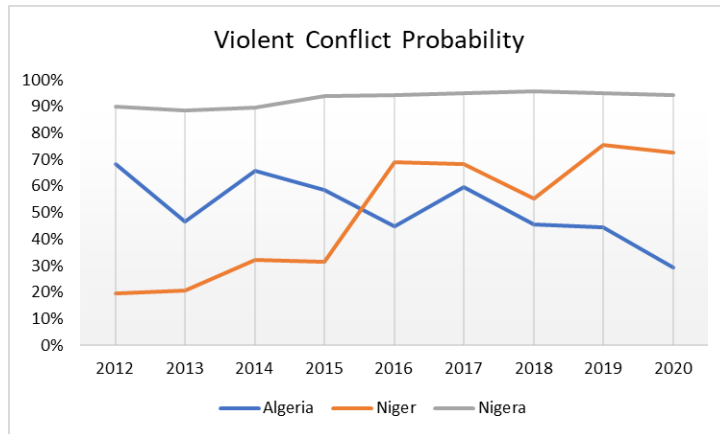
- Threat of political instability is high but waning slowly in Algeria and Nigeria. Niger has been trending worse, sustaining fears about possible spread of coup d'état from other West African countries.
- Despite peaceful political transitions, elite factionalization has remained high. May be related to electoral competition.

- Ease of doing business scores are low but have been on the rise. Suggests institutional alignment around better governance and increased focus on attracting investment.²

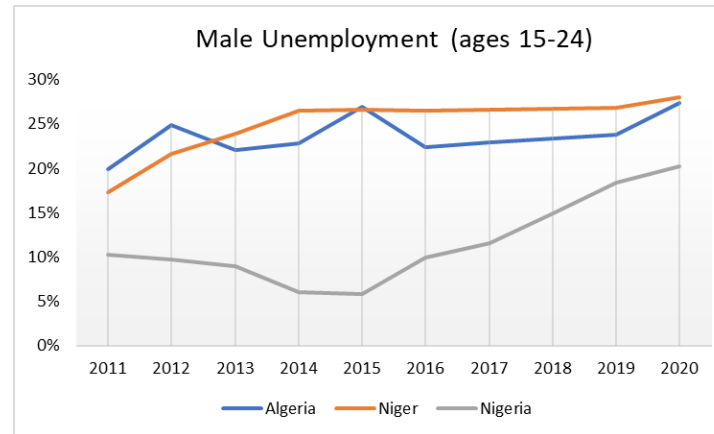
- Future trends are hard to predict, likelihood of changes to key sector policies is uncertain.

¹ Political Instability scores range from -2.5 (weak) to +2.5 (strong). ² Ease of doing business scores range from 0 (low ease of doing business) to 100 (maximum ease of doing business).

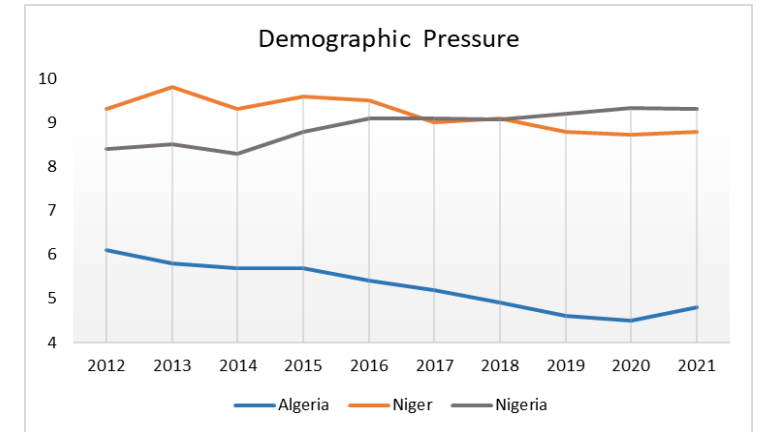
The view from the ground along the TSGP route (Continued)



<https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Results-and-data/moduleId/1782/id/433/controller/Admin/action/Results>



<https://data.worldbank.org/country/>



Fund for Peace, <https://fragilestatesindex.org/excel/>

- Violent conflict

- Probability of violent conflict is persistently high in Nigeria and has risen substantially in Niger since 2012. In Algeria, it has declined ~50% in 10 years.
- Civil war in Libya and anti-insurgent military action in the Sahel can impact intensity, longevity and outcome of conflicts.
- High demographic pressure on food sufficiency may also increase risks of violent conflict in future.¹

- Unemployment and economic opportunity

- High male youth unemployment persists. On average, it rose from 16% to 25% across the three host countries in the 2011-20 period. Some regions along pipeline path may have higher rates than national averages.
- High unemployment likely contributes to Sahelian insurgencies, Niger delta activism, and banditry in northern Nigeria.

¹ Demographic Pressure scores range from 0 (good) to 10 (bad).

Mitigating non-technical and non-market risks to the TSGP's success

- **Gain broad societal support for pipeline project in host countries**
 - Transparency: Commit to report pipeline revenue according to the Extractive Industries Transparency Initiative (EITI) principles to minimize opposition and public perception of the project as an elite benefit or “white elephant” project.
 - Communications strategy: Link benefits of pipeline to citizens’ aspirations for upward mobility e.g., pertaining to employment opportunity and entrepreneurial success.
 - Corporate social responsibility: Embed local content policies into procurement processes and when feasible, partner with public entities to achieve project objectives e.g., technical training delivery via local colleges.
 - Environmental stewardship: Insert environmental remediation sub-projects into pipeline project, e.g., reforestation or tree planting can create additional employment opportunities and potentially rejuvenate agriculture in parts of the Sahel.
 - Community engagement: Proactively consult with and obtain buy-in from civil society groups along pipeline route before breaking ground.
- **Secure pipeline from violent attacks during construction and operations phases**
 - Professionalism: Develop and deploy broad threat identification, deterrence and mitigation strategies encompassing human intelligence, signal intelligence, remote surveillance and psychological resilience techniques amongst others.
 - Threat neutralization: Take advantage of high youth unemployment to increase security personnel along pipeline routes. Create career opportunities around pipeline infrastructure security requirements.

The Payne Institute for Public Policy



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Baba Freeman is a researcher at the Payne Institute for Public Policy, with a focus on the energy and natural resources sector. He has a background in oil and gas financial management and in management consulting. He has worked internationally in different business and consulting roles in both developed and emerging market countries.

Baba has a bachelor's degree in Applied Geophysics, and master's degrees in Mineral Economics and Natural Resources and Energy Policy from the Colorado School of Mines.

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