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**KONRAD
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Regional Programme Energy Security and Climate Change in Sub-Saharan Africa



Mining Truck ¹

Transformational Economic Potential of Extractive Industries: The Case of Simandou Mountains in Guinea and the Lobito Corridor in Southern Africa

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A critical component of the transition to net-zero carbon emissions is the replacement of fossil fuels for renewable energies and green technologies. This will require a vast amount of minerals and metals. For instance, wind turbines and energy storage technologies require mineral and metal-intensive inputs. Just to produce solar panels, at least 16 different types of minerals or metals are required.

It is widely known that Africa has an abundant untapped potential of critical minerals needed for the deployment of green technologies. Furthermore, the continent possesses a huge renewable energy potential, relevant suitable land for energy development, solar energy, wind power, biomass and

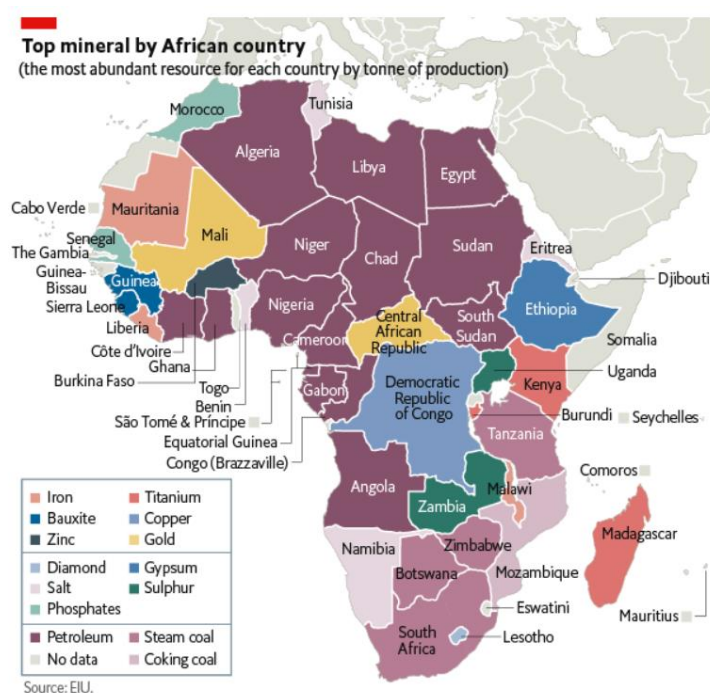
¹[Mining-truck-sm.jpg \(1296x726\) \(state.mn.us\)](#)

hydroelectricity. The continent hosts 30% of the global green mineral reserves.² It is home to significant reserves of cobalt, manganese, natural graphite, copper, nickel, lithium, and iron.³

By 2040, it is projected that renewable energy sources will supply more than 40% of the incremental primary energy demand.⁴ High demand for these clean minerals and metal positions the continent to not only be a key player in the global energy transition but also to advance its position in the global value chains.

Europe, on the other hand, disposes only of a limited stock of these critical mineral resources fundamental to the rapid transition of all aspects of the economy, including energy systems. Hence, Africa is an important partner in espousing the EU's strategy to reduce dependence on single third-country suppliers of critical material. However, in order to create economic growth and job opportunities in Africa, the partnership between Africa and Europe can't be limited to the extraction and export of raw materials but should address economic transformation on the continent as well.

Benefits of the extractive activities are beyond revenues from the sector. Countries stand to also benefit from the economic externalities of the sector. Two examples of potential spillover effects of extractive industries are the creation of economic corridors such as in Simandou Mountain Area in Guinea and via the Lobito Corridor in Angola, DRC and Zambia.



<https://www.panafricanresources.com/invest-in-africa-why-and-how-mining-is-a-good-strategy/>

Business models in Southern Africa (DRC, Zambia and Angola) and Simandou in Guinea:

Growth and Resource Corridor I: The Lobito Corridor

The Lobito Corridor is a planned multi-modal road and 1300-km railway line stretching from the port of Lobito on the Angolan coast at the shores of the Atlantic Ocean traversing Luau on the border with DRC reaching north-western Zambia. Once operational, the corridor will make up the shortest route to the port of Lobito for the Katanga region in the south of DRC and the Copper Belt in North-western Zambia and reduce the carbon emissions from transporting raw minerals. Most of the exports from the mining

²<https://zerocarbon-analytics.org/archives/netzero/developing-africas-mineral-resources-what-needs-to-happen#:~:text=African%20countries%20have%20huge%20energy,position%20in%20global%20value%20chains.>

³<https://unctad.org/news/unlocking-africas-critical-mineral-wealth-energy-transition-can-pave-path-new-prosperity#:~:text=Africa%20is%20home%20to%20sizeable,0.6%25%20of%20iron%20ore%20globally.>

⁴ <https://www.aa.com.tr/en/energyterminal/solar/renewables-to-supply-over-40-of-energy-demand-by-2040/14563>

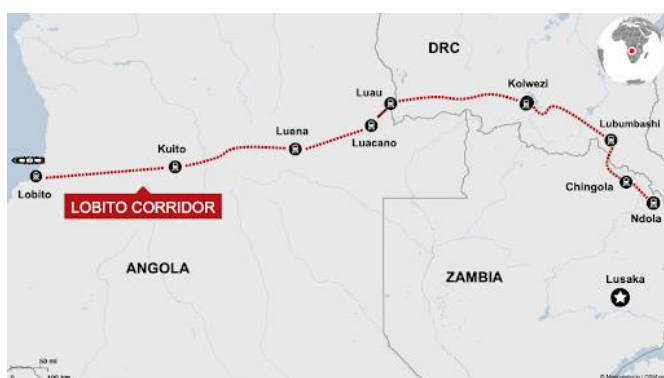
regions have up until now been transported by truck and rail to Tanzania or 8000 km to South Africa. A costly and slow shipping process.⁵

Amid increasing global demand for clean energy minerals, the Lobito corridor is well-situated to advance the value chains of these critical minerals.⁶ The resurgence of interest in the development of the corridor is due to the need to drastically lessen the transportation time and better connect critical mineral rich regions in DRC and Zambia with the global markets. The DRC is the principal producer of cobalt, accounting for 70% of total global production. The country is also the world's leading producer of coltan and second largest producer of copper. DRC's mining portfolio boasts reserves of lithium (white gold), nickel and rare earth elements. Moreover, Zambia is Africa's second largest and world's eighth largest copper producer. It also possesses cobalt, manganese and nickel reserves.⁷

Angola is the second largest oil producing country in Sub-Saharan Africa (SSA)⁸ and is in the process of building three oil refineries including one in Lobito.⁹ The country's interest in developing the transport corridor is reinforced by the need to transport imports to the mines, particularly oil (once the refinery is completed). The corridor could potentially cause massive savings given that energy and transport costs constitute a bulk of expenditures in operating mines.¹⁰

The core component in the Lobito corridor is the railway system. It involves the rehabilitation of the Benguela railway that was completed in 2014 and includes not only tracks but also locomotives, wagons and 70 railway stations and warehouses. In the project, the Port of Lobito has been expanded and modernised with one container terminal, one mineral terminal and oil terminal. The port will have the potential to move 3.7 million tons which will stretch to 4.1 million, once the Benguela Railway is working at its full potential. Another crucial component of the corridor is one international airport in Catumbela between Lobito and Benguela. Provincial airports along the corridor such as Benguela, Huamambo, Kuito and Luena will benefit from rehabilitation and modernization. Over 40% of Angola's population lives within the corridor's footprint and its catchment zone.¹¹

Concurrently, the corridor includes a significant road network from to DRC and Zambia through the Luau-Dilolo border post. The road will also connect with the road system in DRC at Kolwezi and in Zambia from Luena through Cazombo to Solwezi. This is projected to become a highway linking Lobito to Beira in Mozambique that will be running parallel to the Benguela railway. The highway will be called Trans-African Highway (TAH 9).¹²



Source: The China-Global South Project (CGSP)

<https://chinaglobalsouth.com/2023/09/11/u-s-eu-unveil-next-steps-in-the-expansion-of-angolas-lobito-corridor-railway/>

⁵ <https://www.cmi.no/publications/file/5510-diversification-and-development-or-white-elephants.pdf>

⁶ <https://africanminingmarket.com/critical-minerals-africa-2024-to-explore-lobito-corridors-role-in-streamlining-mineral-trade/1838>

⁷ See 4 above

⁸ <https://www.trade.gov/energy-resource-guide-angola-oil-and-gas>

⁹ <https://allafrica.com/stories/202310170088.html>

¹⁰ see 4 above

¹¹ https://icglr.org/images/pdf_files/project_3-3-3-_lobito_corridor_project.pdf

¹² see 4 above

Growth and Resource Corridor II: The Simandou Mountains in Guinea

Located at the Simandou mountain ranges, in the south-east of the country, and covering a surface area of more than 100km, are untapped iron ore reserves which are considered one of the purest deposits (tier-one) of the steel-making raw material. Once extracted at full production, Guinea would be on the trajectory to becoming the second-largest exporter and fifth-largest producer of iron ore globally, with the quantity hovering around 110 million tons annually¹³. At full production, Simandou could potentially double Guinea's economy.¹⁴

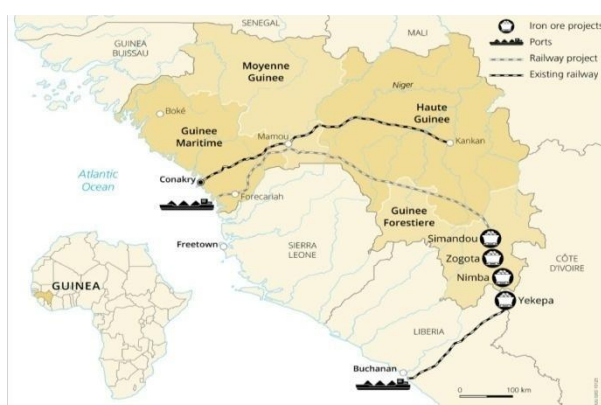
The transformational gains from extraction of over 2 billion tons of untapped reserves of high-grade iron in Simandou Mountain are two-fold.

First, the mines, at full production capacity will help to secure global supply chains of high-quality iron-ore, imperative for low-carbon infrastructure. The Simandou project underscores Sub-Saharan Africa's (SSA) strategic role in sustainable raw material value chains and in meeting global clean energy targets. Steel is essential for infrastructure development in the transport, energy and technology sectors against the backdrop of expanding urbanisation and development worldwide.¹⁵ However, the traditional steelmaking processes are highly carbon intensive. Steel manufacturing has contributed to 7% of current global emissions.¹⁶ High-grade iron ore like that found in Simandou directly contributes to global decarbonisation efforts by providing suitable raw material for a cleaner steel making process. A crucial step is a switch to a hydrogen-based direct reduced iron (DRI) processes. This type of processing requires a higher grade of iron ore.¹⁷

Second, the extractive-related infrastructure that links the mines, rails, roads and ports to ensure the safe, reliable shipping of the iron ore to the manufacture will catalyse economic activity across complementary industries: agriculture, services, freight and trade along the corridors' footprint.

Akin to the Lobito Corridor, Simandou iron ore mines and contingent infrastructure development to transport the ore is expected to catalyze economic development that can benefit local populations and give them access to the global economy. Furthermore, it will likely benefit populations across borders, particularly in the Manu River Union region (Guinea, Liberia, Sierra Leone, and Côte d'Ivoire (Ivory Coast)

greatly stimulating regional trade and economic integration by strengthening value chains. Similar to the Lobito Corridor, Simandou's emerging corridors will reduce logistics costs and the carbon footprint of exporting metals by reducing median transport time.



Iron ore deposits and related infrastructures in Guinea.¹⁸

¹³ <https://www.mining-technology.com/projects/simandou-iron-ore-project-guinea/?cf-view>

¹⁴ https://www.annualreports.com/HostedData/AnnualReportArchive/r/LSE_RIOA_2013.pdf

¹⁵ <https://worldsteel.org/about-steel/steel-story/>

¹⁶ <https://www.iea.org/>

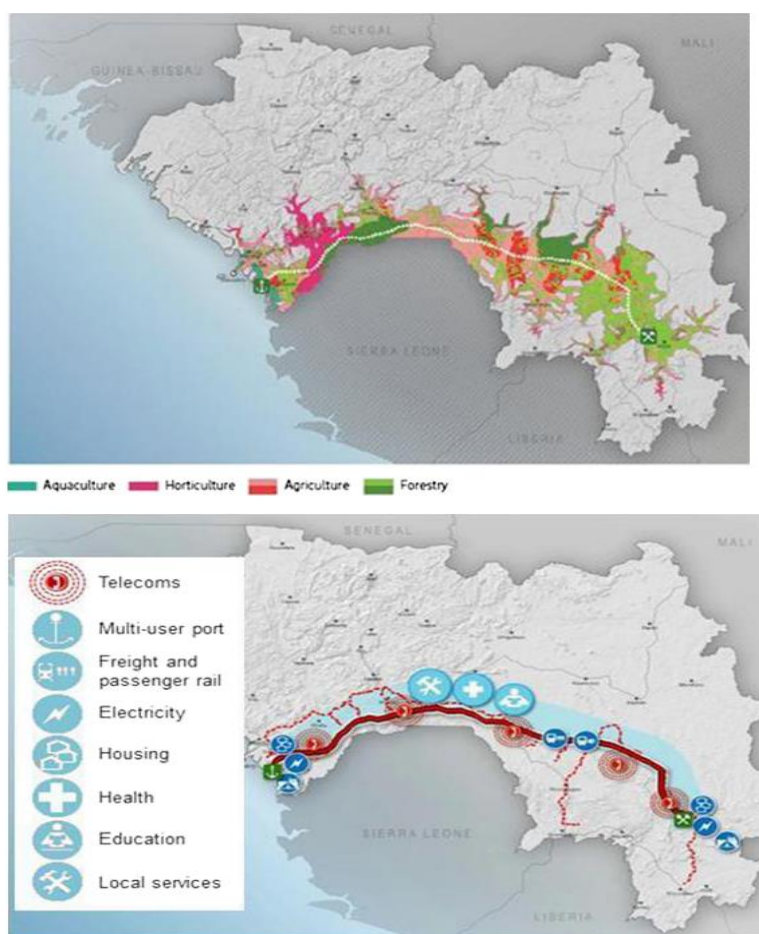
¹⁷ <https://ieefa.org/resources/iron-ore-quality-potential-headwind-green-steelmaking-technology-and-mining-options-are>

¹⁸ <https://www.sciencedirect.com/science/article/pii/S2214790X22001113#cebibl1>

Two resource corridors are likely to germinate from the extraction of iron ore in the Simandou mountain ranges. First, the Southern Guinea Growth Corridor (SGGC), starting from Simandou, running along the border with Sierra Leone to reach Port Morebaya and the Liberty Corridor, a more optimal route will run from Simandou to the port of Buchanan in Liberia.

The Southern Guinea Growth Corridor (SGGC): This Infrastructure project will include a 650 km long railway linking Simandou mountain range to Conakry, 235 bridges, 24 km of tunnel and a deep-water port at Morebaya.¹⁹ Beyond being a physical passageway, the project will be an economic artery to a population of 1.8 million people (excluding Conakry) living in an area of 42000 km² (2-hour travel time) along the project infrastructure. The government has identified in its Poverty Reduction Strategy Paper, this corridor to be a key policy tool for promoting economic growth.²⁰

These transport corridors also foster regional integration and create regional value chains. The SGCC could be extended to neighbouring landlocked countries such as Mali and Burkina Faso, facilitating trade.



Simandou project's investment and infrastructure footprint²¹

Primary sector development potential within the SGGC.²²

The potential for lateral linkages from the infrastructure project include access to a highly fertile yet unexplored region. Concurrently, existing agricultural basins will be linked to markets in urban areas. The deep-water port in Morebaya will bolster seaborne international trade by adding a much-needed shipping capacity.²³

¹⁹ <https://www.mining.com/game-changing-20-billion-simandou-deal-signed-81432/>

²⁰ <https://link.springer.com/article/10.1007/s13563-014-0052-x>

²¹ <https://www.iisd.org/sites/default/files/publications/case-study-guinea-horizontal-linkages.pdf>

²² See footnote 20 above

²³ see footnote 14 above

In the long term, the Southern Guinea Growth Corridor offers a viable opportunity for a regional strategic corridor by extending the multi-user infrastructure to Mali, Burkina Faso and even northern Nigerian cities seeking efficient and economic logistical access to the sea.²⁴

The Liberty Corridor: The Liberty Corridor links Guinea and Liberia through the multi-user rail and road upgrades. It would connect Guinea from Simandou to a new deep-water port in Didia, Liberia.²⁵ The route measures only 350 km and the rail link would only require an upgrade and minimal extension of the existing Yekepa - Buchanan infrastructure corridor. Liberia's shore is reported to possess superior geographic conditions for a deep-water port for valemex vessels (large ore carriers). The investment will also include an upgrade of road networks between Nimba district and fibre optic telecommunication between Guinea and Liberia with the potential for extension.²⁶ The infrastructure project is estimated to cost between \$3-5 billion²⁷. The project extends to the energy sector, incorporating a hydropower network from Côte d'Ivoire into Nimba and Guinea and establishing fibre optic telecommunication cable throughout the region.²⁸

The project, which is estimated to cost between \$3-5 billion, would unlock broad-based economic activities beyond mining, such as in agriculture and manufacturing, significantly improving the lives of the more than 800,000 people living within the artery. The corridor would expand the hydropower network from Cote d'Ivoire into Guinea and Liberia. The Manu River region, has established the Cote d'Ivoire-Liberia-Guinea (CLSG) interconnection project designed to allow the mutual and beneficial exchange of power to consolidate regional peace, guarantee a reliable supply of power to spur economic growth by meeting the demand for development of industries and improve the quality of life in rural communities.²⁹

Economic Spill-Over Effect from Economic Corridors.

A boom in extractive industries in Africa could be accompanied by an unprecedented expansion of infrastructure such as roads and railways to support these industries. These infrastructures built into sparsely populated regions will catalyze economic growth creating an economic artery along its footprint. The corridor is not only a physical pathway but also a strategic corridor that traverses borders promoting integration and improving livelihoods. The transport routes to ensure reliable and timely delivery of the ore to the manufacturer (upstream value chain) will spur horizontal/lateral linkages; new industries based on capabilities and skills from industry supply chains, providing an opportunity for economic diversification away from the extractive sector. It will unlock broad-based economic activity across complementary industries: agriculture, services, logistics and trade along the corridors' catchment area, within the country and regionally. Economic resource corridors "spill-over benefits" occur through backwards linkage involving the local procurement of goods and services or through processing of extractive outputs that have been created (forward linkages).³⁰

Economic corridors penetrate to areas and regions, opening up remote regions, where agriculture has been constrained by the lack of access to markets. New and upgraded access roads will lessen the cost and travel time to and from villages and towns. They provide transport infrastructure and electricity that will increase agriculture supply-chain efficiencies. The corridors have the potential to influence patterns of agricultural and rural development by unleashing major expansion of arable crops. Growth poles (urban locations) created along the corridors' footprint create a demand for agricultural products. Corridors could influence shifts to African-sourced foods from imported food; which rapidly growing African cities are largely dependent on. They not only link remote areas with markets in African cities but also ports from which the agricultural products can be exported.³¹ The Lobito corridor transverses one of Angola's most agriculturally abundant areas with high potential for farming and cattle ranching. Shortly

²⁴ <https://energycapitalpower.com/simandou-project-transguinean-iron-ore/>

²⁵ <https://www.railjournal.com/africa/liberty-corridor-to-connect-guinea-and-liberia/>

²⁶ See footnote 21 above

²⁷ See footnote 25 above

²⁸ See footnote 9 above

²⁹ <https://my.southsouth-galaxy.org/en/solutions/detail/CLSG-interconnection-project>

³⁰ <https://www.elledframework.org/topics/economic-links-to-businesses-beyond-extractives-procurement>

³¹

https://www.researchgate.net/publication/259171682_Mineral_industries_growth_corridors_and_agricultural_development_in_Africa

after Angola's Independence, in 1975, a 27-year long civil war erupted that ended in 2002. The war severely damaged the country's economy. Prior to the war in the country, the country was a net exporter of maize, coffee, sisal and tropical fruits.³² Benguela province, for instance, produces sorghum, maize, potatoes, sweet potatoes, beans, cassava, vegetables, coffee and fruit (bananas, citrus fruits, pineapples, mangos, passion fruits). Prior to the war, the province also produced sisal, cotton, sunflower, sugar cane, palm, tobacco, and cattle for meat and milk.³³

The development of resource corridors promotes local content by creation of employment opportunities and creation of business opportunities for local contractors. The SGCC is projected to create 10,000 direct jobs and more than 100,000 induced jobs will emanate from the project. Simandou and by extension, it is estimated that Guinea's economy could be revitalized by more than 3500 local subcontractors³⁴ that will be employed to build fiber optic/wireless infrastructure or provide much needed inputs and services.³⁵ Approximately 100,000 Angolans were employed in the construction of the Benguela railway and 10,000 received training as railways technicians. In addition, it is a requirement by the Angolan authorities that 25% of inputs in the construction of the Lobito corridor be locally sourced.³⁶ Training provided to workers and businesses facilitates skills and technology transfer. Therefore, over 1000 SMEs, members of six cooperatives in the construction sector could potentially directly benefit from the Lobito corridor.³⁷

The corridors will generate development/growth poles (points of economic growth) along and at the end of the railway. In Angola, the corridor has facilitated the reestablishment of commercial links between the inland and coastal areas and between urban and rural areas. It has developed along the way marketplaces and distribution points for low-income households that have morphed into "intermediate trade centres". These villages and settlements that were deserted during the 1975-2002 civil war have now been revitalized.³⁸ A cluster of new trade areas will also be created through investment in power generation, employee housing, training facilities, social infrastructure and financial services hubs in towns. These growth poles are attractive for emerging small-scale traders and transport operators and have the merits of providing a training ground for rural-to-urban migrants and hub for the distribution of information, ideas and social mobilization.³⁹

Economic corridors have the massive potential to not only spur intra-regional but also global trade and foster market integration. For some landlocked countries, the corridors are an opportunity to participate in global trade. Intended for seamlessly transportation of merchandise, people and amenities between regions, these transport conduits frequently link key economic centres, promoting economic growth, trade and commerce and cooperation between adjacent countries.⁴⁰ For instance, the Lobito Corridor Investment Promotion Authority (LCIPA) is an agency designed to maximize and promote trade, investment and economic integration and between Angola, DRC and Zambia. It brings together permanent multi-stakeholder engagement mandated to link all public and private entities interested in advancing and participating in the corridor.⁴¹ The SGCC or the TransGuinean corridor is an opportunity for a strategic conduit for people and freight from Mali, Burkina Faso and northern Nigeria seeking a quick and economical way to access the sea.⁴²

With optimal local content and procurement policies (LCP) that encourage utilization of local goods and services in the extractive sector; in a bid to stimulate economic activities in other industries and create

³² https://icglr.org/images/pdf_files/project_3-3-3-_lobito_corridor_project.pdf

³³ See footnote 4 above

³⁴ <https://www.engineeringnews.co.za/print-version/simandouiron-ore-project-guinea-update-2023-02-16>

³⁵ See footnote 14 above

³⁶ See footnote 4 above

³⁷ <https://projectsportal.afdb.org/dataportal/VProject/show/P-Z1-KF0-027>

³⁸ See footnote 30 above

³⁹ See footnote 26 above

⁴⁰ https://www.researchgate.net/publication/374409781_Importance_of_Economic_Corridors_as_Driver_of_Regional_Integration_South_Caucasus_and_Central_Asian_Context

⁴¹ <https://www.lobitocorridor.org/about>

⁴² <https://energycapitalpower.com/simandou-project-transguinean-iron-ore/>

jobs for the local communities, economic corridors promote sustainable and inclusive development locally and regionally.

Conclusion.

The global transition from fossil fuels to clean energy sources heavily relies on critical energy transition minerals. Africa possesses a significant share of global reserves of these salient raw minerals.

The demand for these minerals and metals presents a twofold benefit for Africa. Revenue generated from the extractive industries can bolster Africa's economy by offering an opportunity for governments to better finance development, countries to overcome commodity dependence, creating jobs and raising living standards across the continent. African countries can chart a path towards prosperity, inclusive growth and sustainable development. Additionally, the sector has spill-over effects on other sectors of the economy. Transport routes that service the large extractive industry project transform to economic corridors, promoting regional integration, catalyzing economic activity across complementary industries: agriculture, services, freight and trade along the corridors' footprint. It promotes local content by creation of employment opportunities and business opportunities for local contractors.

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