The Power of the Mine

A Transformative Opportunity for Sub-Saharan Africa

Follow the conversation on Twitter with @WBlive and #Power4Africa

ESMAP
Energy Sector Management Assistance Program

SAFETE
South African Fund for African Energy, Transport and Extractive Industries

WORLD BANK GROUP

Africa Region
sustainable development

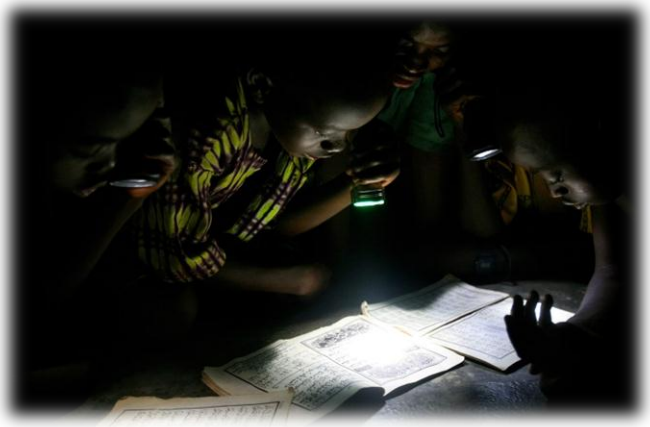
http://www.worldbank.org/africa/powerofthemine

Africa's power deficit is crippling despite huge energy resources

Hydro potential: 400GW
Geothermal potential: 16GW
Natural Gas reserves: 329 tcf

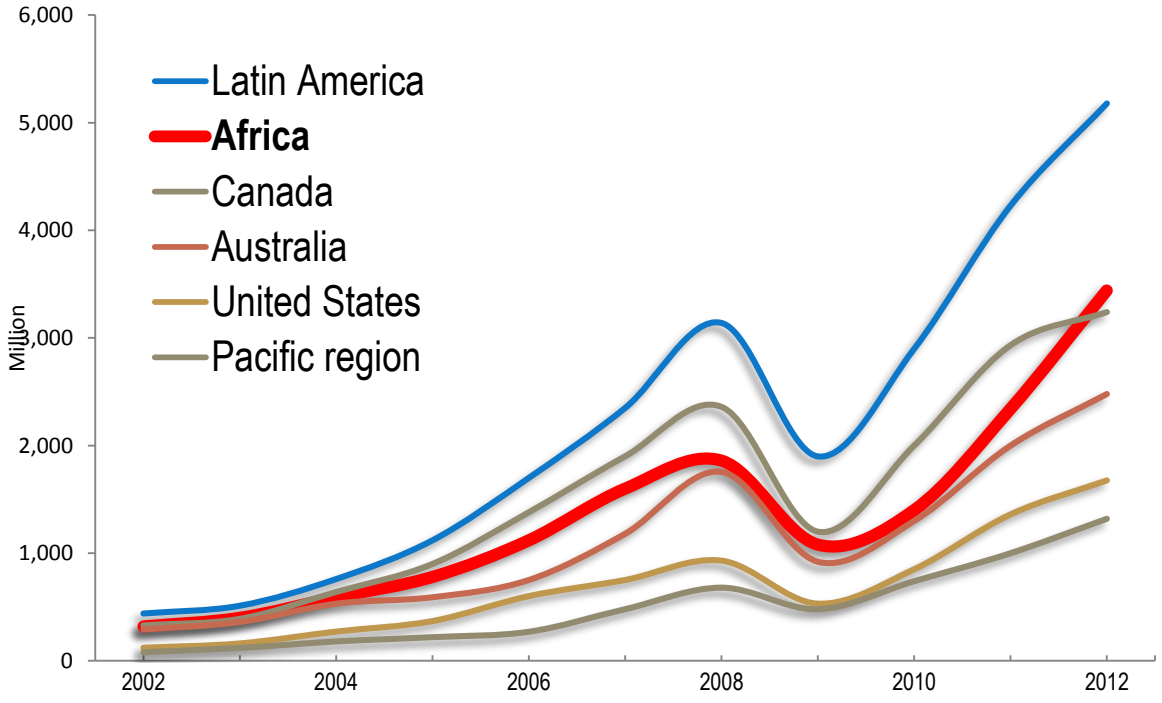
Currently, about **1-2 GW** of new installed capacity deployed a year. Africa needs **6-7 GW** a year

Can mines as anchor consumers be part of the solution?



Mining is a key and well-established industry

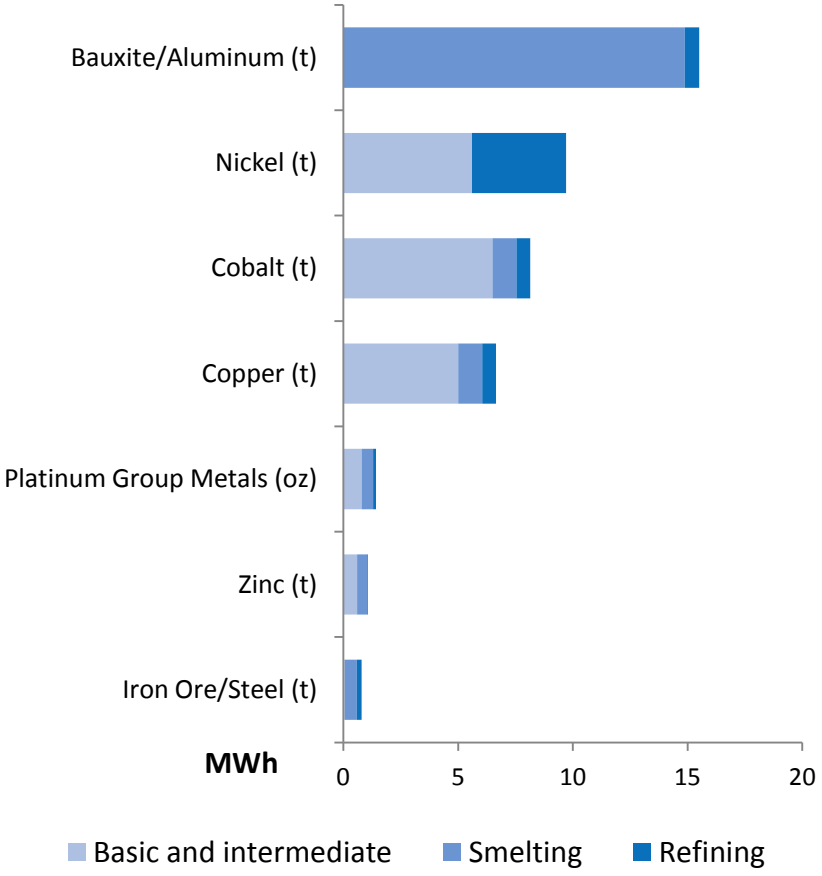
- Mining exports represents over 20% of exports in 18 countries and over 40% in 14 countries.
- Mining fiscal revenues over 20% in total revenues in Botswana, DRC, and Guinea



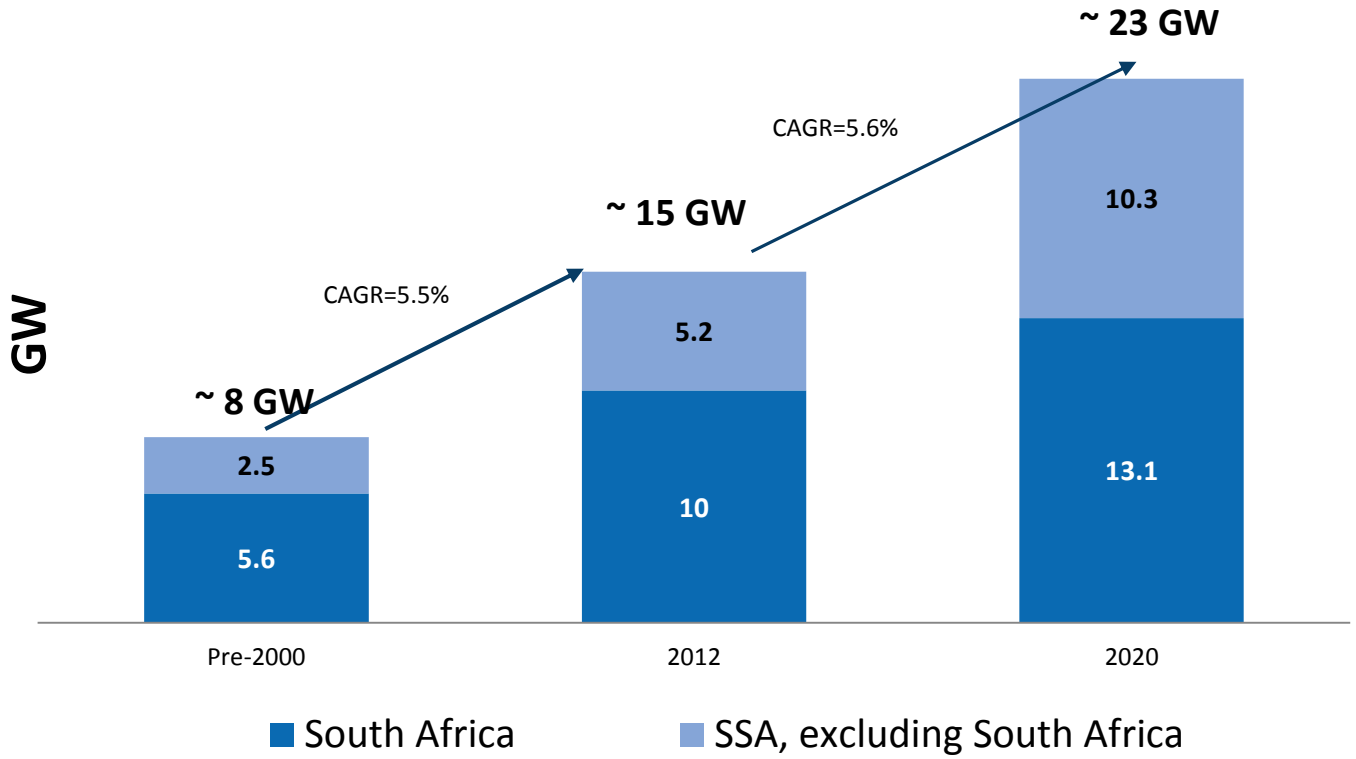
Investment in mining accounted for $3.1 billion between 2000 -2012…

…and will go up to $75 billion in SSA in pipeline projects

Power needs depend on the type of mineral and level of processing



Mining demand for power can be up to 23 GW in 2020



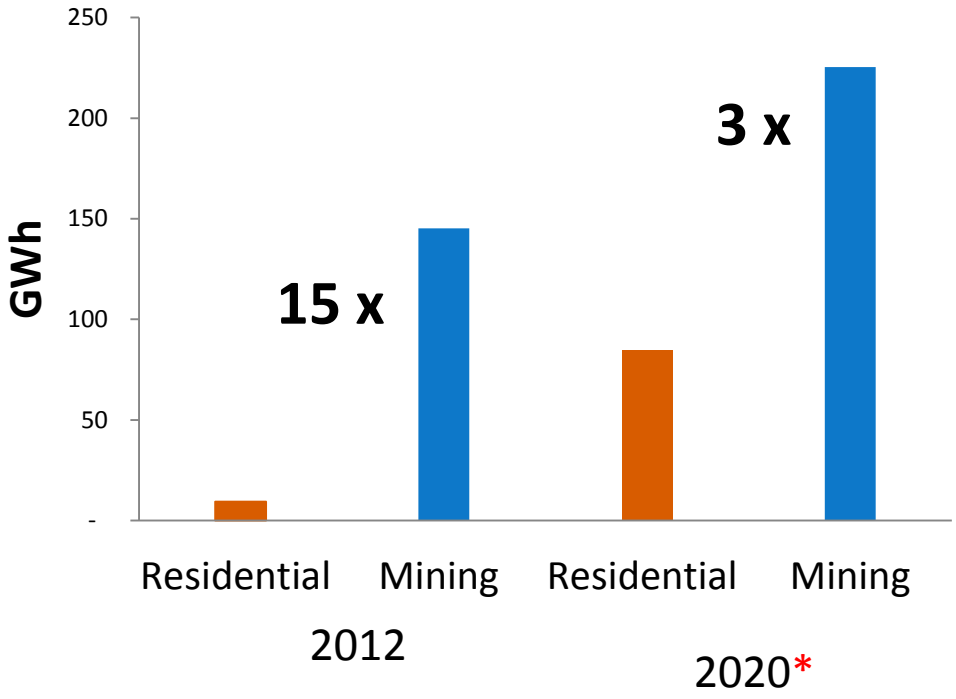
Note: CAGR=Compound Annual Growth Rate

South Africa **= 3.5%**
SSA, excluding South Africa **= 9.2%**

Highest increase in power demand –
Iron Ore and PGM
Refining and Smelting

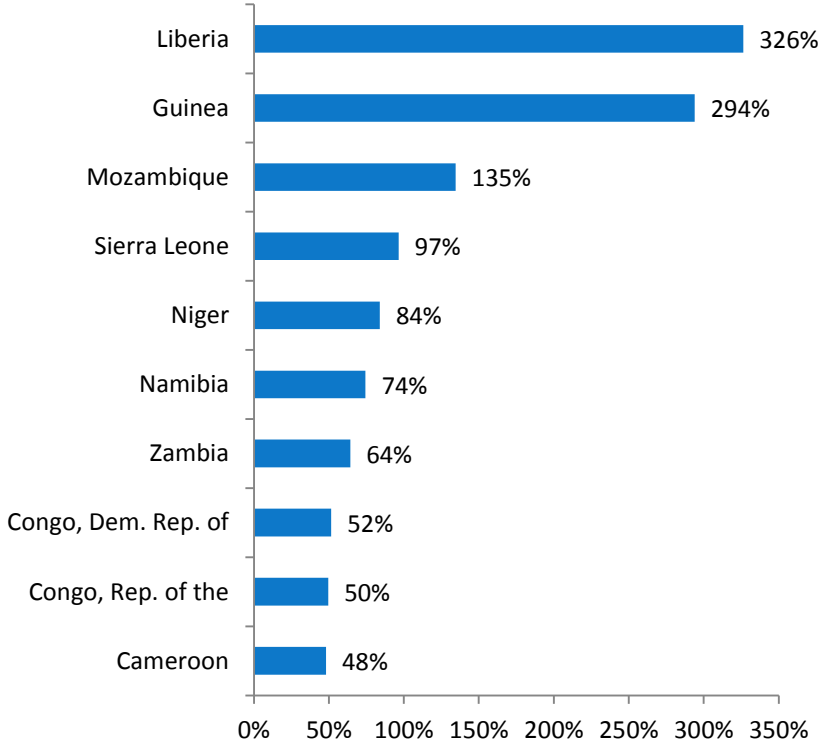
Mining demand for power can be overwhelming in a few countries

Mining and residential demand



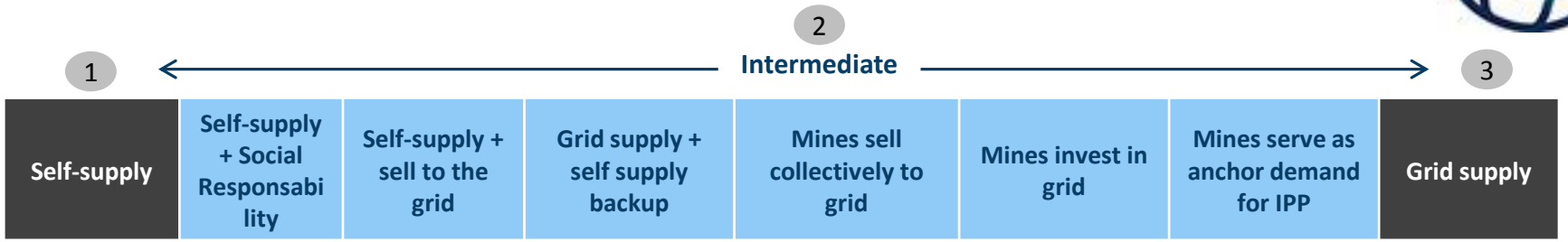
***If all SSA's population had access to electricity by 2020 with triple level of today's consumption**

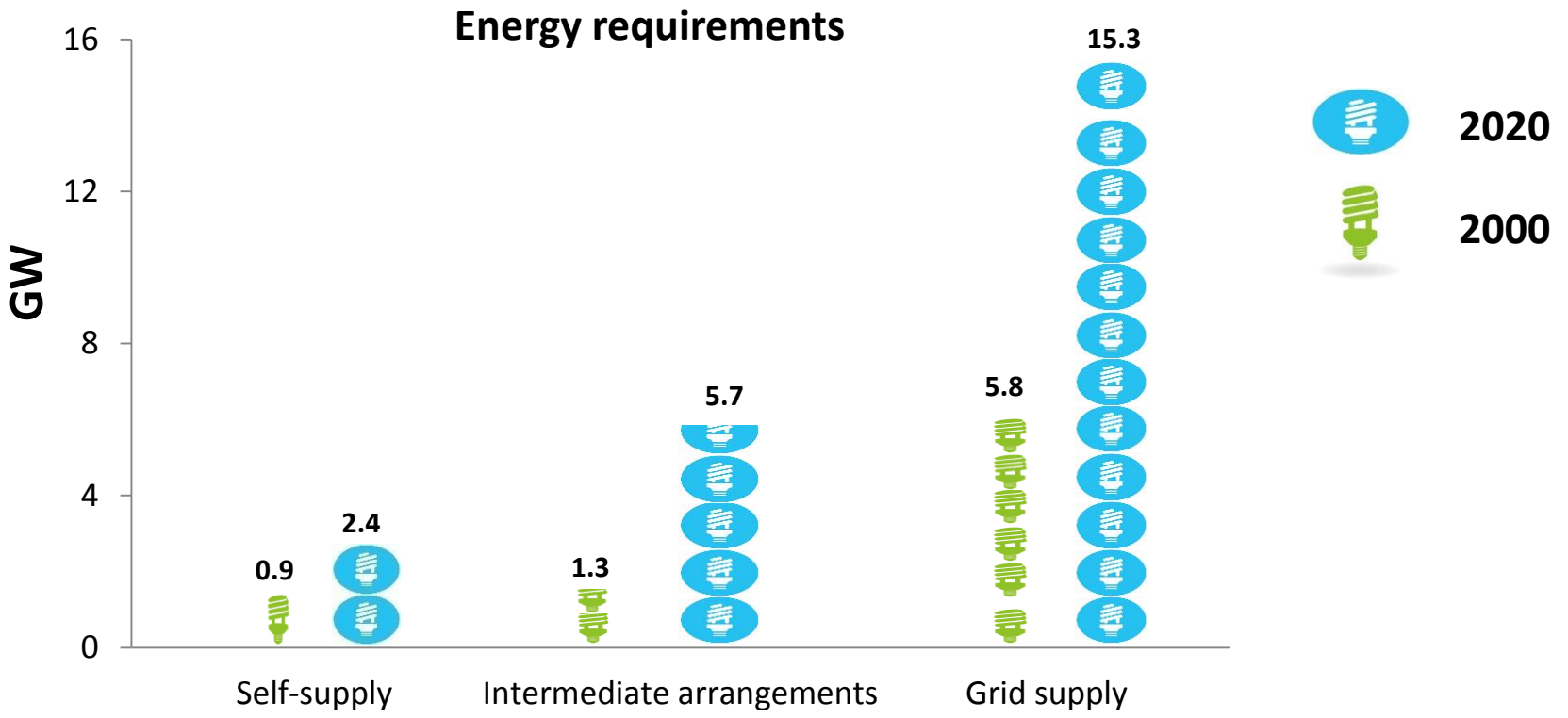
Mining and nonmining (residential, commercial, industrial) demand



Mining demand as % of total non-mining demand

Many models of power sourcing by mines

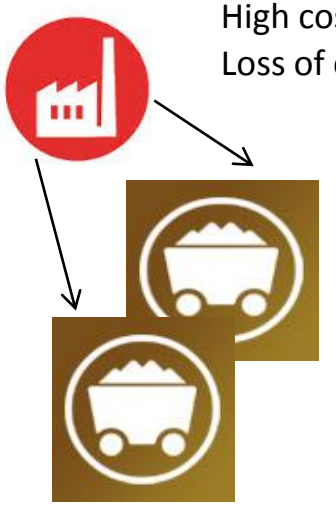




Self supply is a loss for all

Mines:

High cost of electricity
Loss of competitiveness



Grid-connected customers

Mine generation investments in self-supply
2012 – $1.3b
2020 – up to $3.3b

Electricity utility:

Loss of large customers
Loss of steady revenue
Loss of opportunities of economies of scale for large investments

No electricity

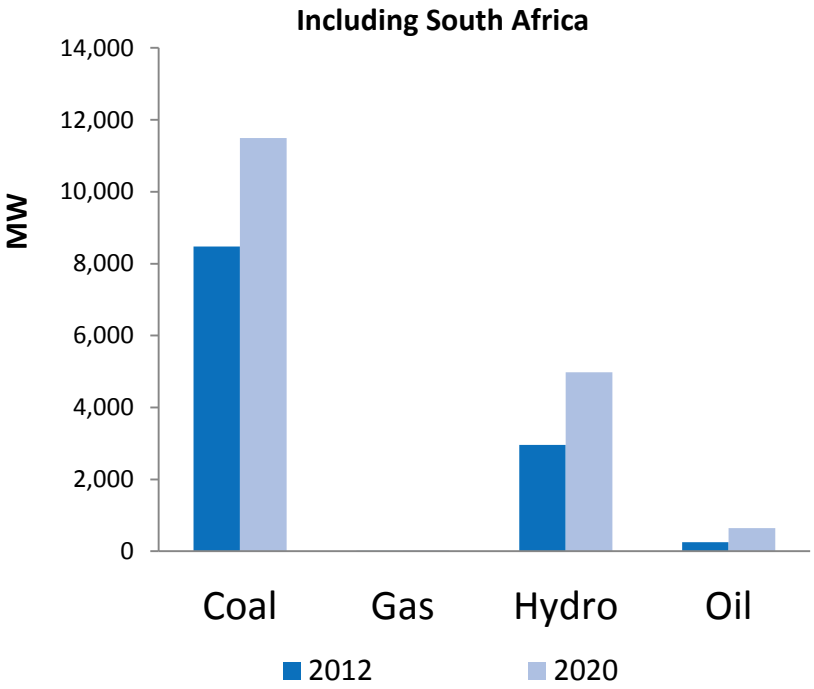
Country:

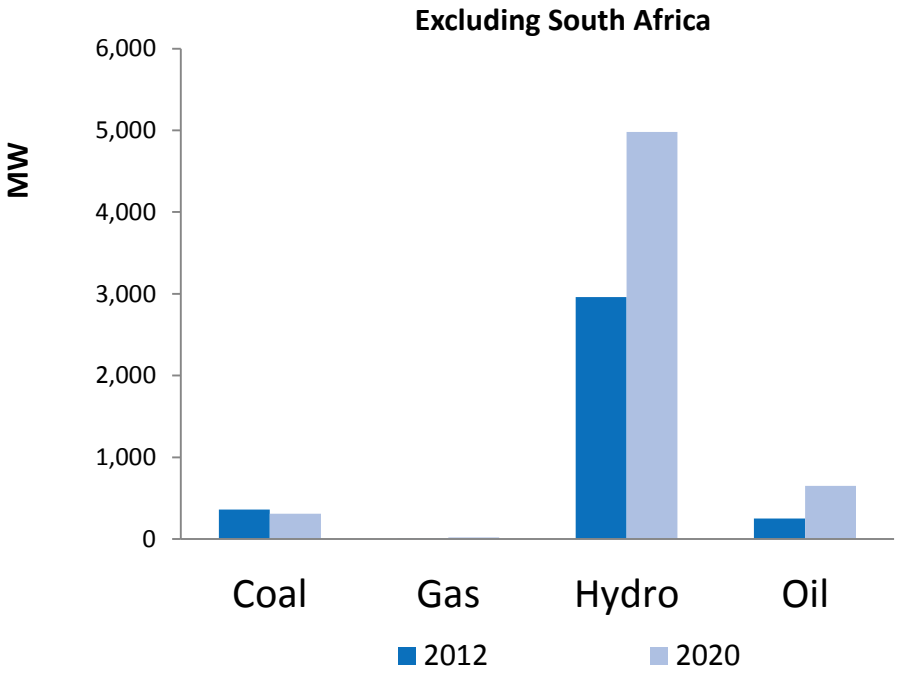
Reducing possibilities for access to electricity
Drop in exports and tax revenues
Negative impact on GDP, and fewer jobs

No electricity

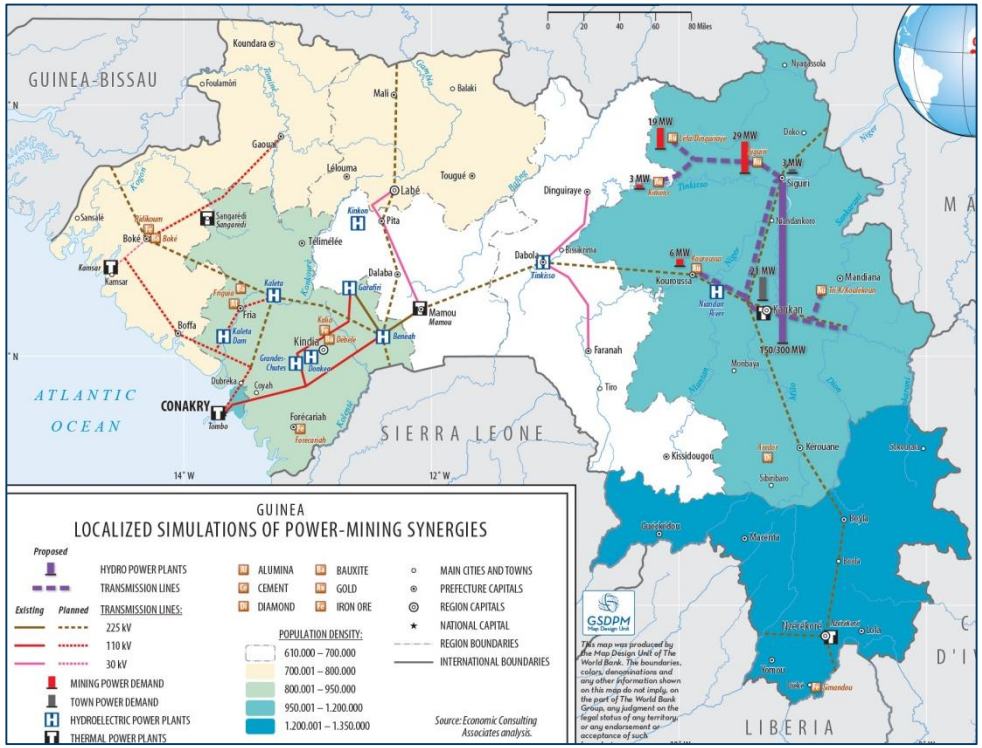
Mining demand for power can unlock clean energy in grid arrangements

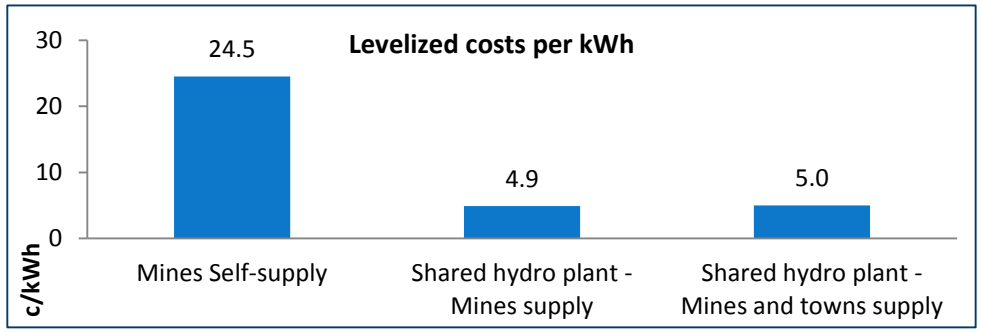
Source of power generation on grid-based arrangements





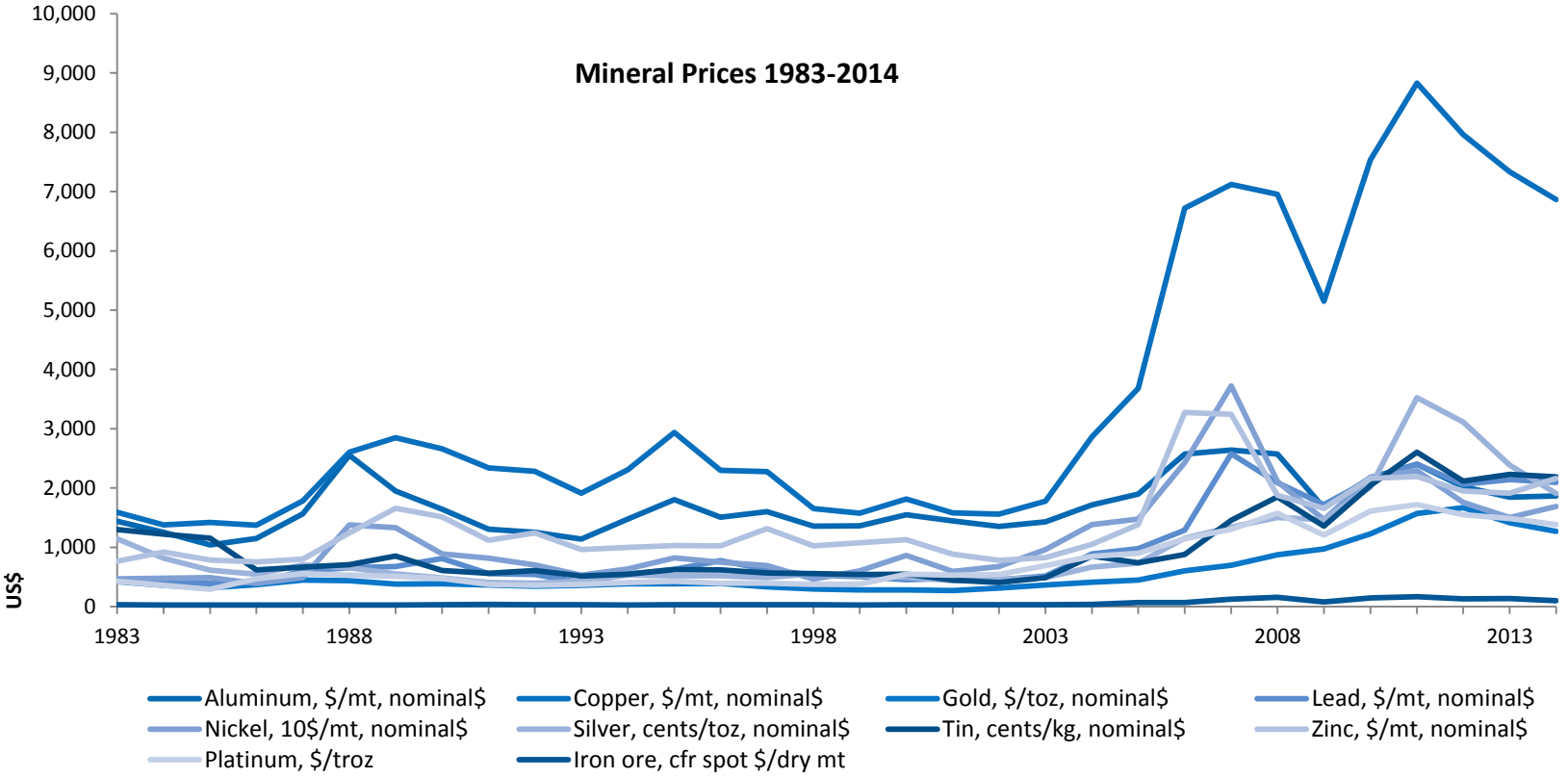
Mining demand for power can unlock clean energy in self-supply arrangements - Guinea





- Five gold mines in North East Guinea: Siguiri, Kiniero, Lefa, Tri-K, and Kouroussa
- Three scenarios:
  - Mines self-supply (diesel)
  - Shared 150MW hydropower plant (HPP) among mines
  - Shared 300MW HPP plant also serves neighboring communities Siguiri and Kankan
- Electrification for community →**5**% of total population.
- Higher capital costs but lower running costs and economies of scale: cost savings for mines around **$640 million**
- Project cost of $**1.4** billion – IPP opportunity

Commodity price volatility can destabilize mining demand for power



Policymakers can support an attractive enabling environment

- Strengthen power sector finances
- Strengthen regulatory mechanisms
- Transparent and efficient pricing
- Support the operating environment for IPPs
- Mine-financed power projects and carefully crafted contracts
- Integrate mining demand in power sector planning
- Use regional platforms
- Source expertise

Future can be bright if we use this opportunity carefully

Thank You

Sudeshna Ghosh Banerjee
Senior Economist
sgbanerjee@worldbank.org
http://www.worldbank.org/africa/powerofthemine

The Power of the Mine

A Transformative Opportunity for Sub-Saharan Africa

Follow the conversation on Twitter with @WBlive and #Power4Africa

ESMAP
Energy Sector Management Assistance Program

SAFETE
South African Fund for African Energy, Transport and Extractive Industries

WORLD BANK GROUP

Africa Region
sustainable development

http://www.worldbank.org/africa/powerofthemine