ENERGISING THE MINE OF THE FUTURE
Energy & Mines Congress, Toronto
TSAKANI MTHOMBENI
10 December 2018
Certain statements in this document constitute “forward looking statements” within the meaning of Section 27A of the US Securities Act of 1933 and Section 21E of the US Securities Exchange Act of 1934.

In particular, the forward looking statements in this document include among others those relating to the Damang Exploration Target Statement; the Far Southeast Exploration Target Statement; commodity prices; demand for gold and other metals and minerals; interest rate expectations; exploration and production costs; levels of expected production; Gold Fields’ growth pipeline; levels and expected benefits of current and planned capital expenditures; future reserve, resource and other mineralisation levels; and the extent of cost efficiencies and savings to be achieved. Such forward looking statements involve known and unknown risks, uncertainties and other important factors that could cause the actual results, performance or achievements of the company to be materially different from the future results, performance or achievements expressed or implied by such forward looking statements. Such risks, uncertainties and other important factors include among others: economic, business and political conditions in South Africa, Ghana, Australia, Peru and elsewhere; the ability to achieve anticipated efficiencies and other cost savings in connection with past and future acquisitions, exploration and development activities; decreases in the market price of gold and/or copper; hazards associated with underground and surface gold mining; labour disruptions; availability terms and deployment of capital or credit; changes in government regulations, particularly taxation and environmental regulations; and new legislation affecting mining and mineral rights; changes in exchange rates; currency devaluations; the availability and cost of raw and finished materials; the cost of energy and water; inflation and other macro-economic factors, industrial action, temporary stoppages of mines for safety and unplanned maintenance reasons; and the impact of the AIDS and other occupational health risks experienced by Gold Fields’ employees.

These forward looking statements speak only as of the date of this document. Gold Fields undertakes no obligation to update publicly or release any revisions to these forward looking statements to reflect events or circumstances after the date of this document or to reflect the occurrence of unanticipated events.
Global Footprint

Gold Fields Group
- Energy usage: 12,178 TJ
- Energy spend: US$258m (17% of OPEX)
- US$115/ounce
- Carbon emissions: 0.66t CO₂-e/oz

Americas region
- Mine: Cerro Corona (Peru)
- Project: Salares Norte
- 307koz
- 10% of GFL total energy

South Africa region
- Mine: South Deep
- 281koz
- 18% of GFL total energy

West Africa region
- Mines: Tarkwa and Damang
- JV project: Asanko Gold Mine
- 810koz
- 46% of GFL total energy

Australia region
- Mines: St Ives, Granny Smith and Agnew
- JV Project: Gruyere
- 935koz
- 26% of GFL total energy

Energising the mine of the future | Tsakani Mthombeni | December 2018
Energy security: not business as usual

Macro trends driving the disruption

Technology trends (supply and demand side): renewables, automation, big data, AI, storage, IoT

New business models and mining methods: design4repurpose not closure, selective mining, dry processes

Environment and society: emerging regulations to drive decarbonization, zero waste, host communities and jobs, GHG reductions, the food/energy/water nexus
Energy security for miners

The energy security debate

- Availability
- Reliability
- Affordability
- Low-carbon type

Energy spend ~17% of OPEX (13% AISC) at Gold Fields

Global oil price volatility

Rising energy demand in mining (deeper, longer, harder, further, etc)

Transition from gas to renewables – reap dual benefits
How the industry and Gold Fields are responding

Increasing leverage off innovation and technology

Increasing industry collaborations

Partnerships (OEM, IPPs, NGOs, Industry Associations, etc)

Creating digitally enabled mines

At Gold Fields:

- Involved in a number of OEM partnerships to pilot new technology
- Partnerships with global IPPs
- Adapting our assets to be digitally enabled

Energising the mine of the future | Tsakani Mthombeni | December 2018
Latest on captive PPAs
The rise and rise of captive PPAs

• Driven by need to hedge against grid price volatilities, emerging climate related regulations

• Commercial (retail and telecoms) sector leads the front

• Mining and materials are fast followers

• Key issue remain:
  • LoM uncertainty and the PPA bankable tenure
  • ESI structure: regulated vs unregulated markets
What Gold Fields has been doing

Implementing an integrated energy and carbon management strategy

2020 aspirational goals:
- costs savings,
- carbon footprint reduction and business integration

Strengthen energy security

Improve energy costs

Reduce carbon emissions (and adapting to Climate-related risks – operations and host communities)

Integrate energy management into business (ISO 50001 ready)
Gold Fields’ electrification journey

Our transitioning story towards low carbon electrification

- 128 kW solar rooftop systems commissioned at Helen Rd
- Agnew power options FS
- 2016 E&M
- GSM diesel to gas power plant (24 MW) commissioned
- Energy security assessments & 5-year regional plans developed
- South Deep 40 MW solar PV FS
- Genset gas turbines commissioned at Tarkwa (22 MW) and Damang (25 MW)
- GSM solar power PFS
- Progressing evaluation at Salares Norte “20% renewable energy”
- Agnew power station PFS
- 2016
- Tarkwa 15 MW gas turbine installed
- Cero Corona 5 MW floating solar PV PFS, negative
- GSM solar power PFS
- Agnew hybrid power station PFS
- ISO 50001 certified
- 2017
- South Deep 40 MW solar PV: Regulatory changes
- Gruyere gas power station (48 MW), ~200km gas pipeline
- GSM solar-battery FS complete, positive
- 2018
- Reviewing renewables in Ghana
- GSM solar-battery construction
- 2019
- ~134MW gas installed, additional 16MW in study
- >55MW solar under study
- >18MW wind under study
- 5MW battery under study
- >200 ktCO2e/year from high impact supply projects
Gold Fields I&T strategy

Leverage I&T for greater energy costs savings

Horizon 3
“+5 years”
- Integrated and advanced energy data analytics
- Dry comminution processes

Horizon 2
“3-5 years”
- Diesel Hybrids
- Electric LVs
- Neutral idle technologies
- Diesel alternatives (CNG/LNG)
- Fleet benchmarking (data)
- In-pit crushing
- Remote smart grids
- Waste sorting
- Automated battery powered equipment

Horizon 1
“1-3 years”
- Visualisation
- Gas, wind and solar power plants
- Conveyors, from mobile equipment
- Fuel switching
- Cleaner fuels
- Efficient Technologies (lights, VSD, motors, vent fans)
- Engine controls
- Electricity metering systems
- Heat recovery
- VoD
- Fuel additives
- Fuel management systems
- Modernise & Visualised
- Integrated & Optimised
- Automation & autonomous

Energising the mine of the future | Tsakani Mthombeni | December 2018
How can we energise the mine of the future

- Electrified: weaned off diesel
- Gas: a key transition fuel
- Diversified energy mix: wind, gas, solar
- Modular and connected
- More storage

These, coupled with OEM technology changes, will disrupt how mines are designed, operated and closed
Thank you