South Australia Mineral Resources
Investment Opportunities

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This presentation

Four main components:
1. South Australia
2. South Australian Commodities
3. Deep cover impediments become opportunities
4. Further Information
South Australia ...
South Australia: central hub for national resources sector

- Mining Services
- Research and Development
- Education, Skills and Training
- Advanced Manufacturing
- Resource rich
- Transport, Power, Water infrastructure
- Access to Asia markets
- Clean, high quality produce (e.g. food and wine)

Adelaide is Australia’s most livable city!
3 Ancient crustal regions:
1. Gawler Craton
2. Curnamona Province
3. Musgrave Province
A Decade of Growth
South Australian Minerals Industry Indicators 2001–2012

Lead indicators – influenced by fluctuating economic conditions

Mineral exploration

Mineral production value

Mineral exports

Mineral royalties

Minerals and Petroleum exploration for 2012/13 was $616.7m ($230.4m – Minerals and $386.3m – Petroleum)
South Australian mineral exploration expenditure by commodity 2012-13

- Copper: $106.3 million (46%)
- Iron ore: $47.9 million (21%)
- Other: $44 million (19%)
- Base metals: $19.3 million (8%)
- Uranium: $10.3 million (5%)
- Gold: $2.6 million (1%)

Total expenditure: $230.4 million

Source: ABS Cat. 8412.0
20 Major Mines / 30 Developing Projects
PACE: Program of Accelerated Exploration

- South Australian Government initiative to reduce exploration risk and increase investment
  - Regional pre-competitive geoscience surveys
  - Collaborative drilling and surveys (co-investment)
  - Streamline tenement applications and mining approvals
    - One-stop-shop
    - Online application and tracking
  - High quality, free, mineral resources data and information delivery
  - International and National collaborations
South Australian Commodities...
Selected South Australian Commodities

- Copper
- Iron Ore and Steel
- Uranium
- Zircon & Mineral Sands
- Gold and Silver
- Lead and Zinc
- Natural Gas
- Oil
- Coal
- Shale Gas
- Opal and Jade
- Salt
- Gypsum
- Dolomite and Limestone
- Silica
- Dimension stone
- Processed petroleum products
- Kaolin
- Graphite
Copper

- 70% of Australia’s Economic Demonstrated Copper Resources

- 2012 production almost 300 000t

- South Australia hosts the 3 most significant new Cu discoveries in past 10 years in Australia
  - **Carrapateena**
    OzMinerals Ltd
  - **Prominent Hill**
    OzMinerals Ltd
  - **Hillside**
    Rex Minerals Ltd
Gawler Craton: Olympic IOCG Province

- Cu-Au ± U deposits and prospects

- c. 1590–1580 Ma timing

- Related to felsic and mafic intrusions and volcanics – Hiltaba Suite and Gawler Range Volcanics

- Equivalent geology in northern Curnamona Province
South Australia, unlike other locations, has a huge gap between the largest and second-largest known copper deposit ... which suggests there is a good opportunity to find more giant deposits.

Source: MinEx Consulting March 2012
Uranium

- 78% of Australia’s total uranium resources
- South Australia has been producing uranium for 25 years
- Efficient legislation, assessment and approvals processes, with best practice environmental regulation
China – South Australia – Saskatchewan
Uranium Geoscience Partnership established
October 2012
Olympic Dam (BHP Billiton Ltd)

- World’s largest uranium deposit (9576 Mt at 0.26 kg/t U3O8 resource)
- Eastern Gawler Craton IOCG hosted (large copper and gold producer as well)
Sediment Hosted Uranium

Palæochannel System hosted U Mines
- **Beverley**
  Heathgate Resources Ltd
- **Beverley North**
  Heathgate Resources Ltd
- **Honeymoon**
  Uranium One Inc
Iron

- In 2012 production was around 11Mt
- Emerging as Australia’s second major iron ore producing state (5% national production)

- Magnetite
  - Cairn Hill
    - IMX Resources NL
  - Wilcherry Hill
    - IronClad Mining Ltd

- Hematite
  - Peculiar Knob
    - Arrium Ltd
  - Wilgerup
    - Centrex Metals Ltd
Heavy Minerals (zircon, rutile, ilmenite, leucoxene)

Jacinth-Ambrosia
- Iluka Resources Ltd
- World’s largest zircon deposit
- Resource 293.9 Mt @ 4.7% HM
- 39% zircon
- 29% ilmenite
- 4% rutile

Mindarie
- Murray Zircon Pty Ltd
- Reserve 58.1 Mt @ 4.3% HM
- 21.2% zircon
- 64.8% ilmenite
- 4.8% rutile
- 6.4% leucoxene
Eucla Basin Heavy Mineral Sand deposits – ancient shorelines

Jacinth zircon mining
Graphite

- **Gawler Craton**
  Eastern Eyre Peninsula - best geological environment for flake graphite in Australia

- High-grade metamorphism of Late Archean – Early Paleoproterozoic chemical and organic-rich sediments
Deep cover impediment becomes opportunity...
The Exploration Challenge: 80% of South Australia has transported cover

Deep Exploration Targeting

A New Search Space

South Australian Government is major participant in Deep Exploration Technologies Cooperative Research Centre (DET CRC)
Industry Issue: Exploring through deep cover

Transported cover
E.g. 200 to 400 m thick
Far miss
Near miss
Direct hit
Ground surface

Samples
Weathering front

1000 m
250 m
50 m

GOSSAN
ORE DEPOSIT

Not to scale

After R.E Smith & B Singh, 2007
Mapping buried mineral systems: enlarging buried target and provides framework for next drillhole

Emmie Bluff 3D Model
Copper Shell (0.8%)

Key
- Hematite
- Magnetite
- Hematite – Magnetite
- Albite
- K-Feldspar
- Sericite
- Sericite – Chlorite
- Chlorite
- Copper Shell

Emmie Bluff 3D Model
Alteration Voxet

500 m x 500 m x 10 m cell size
10x vertical exaggeration
Regional Mineral System Drilling

An approximate 10x10 km drilling array would provide undercover mapping and detection of buried IOCG mineral systems in the highly prospective eastern Gawler Craton.

We are planning for this to commence in 2015 in collaboration with DET CRC researchers and emerging technologies.
Further Information ...
Free SmartPhone App for South Australia Mining Investors...

“\n\nThe South Australia Mining App will become your go-to guide for resources investment. With real-time data at your fingertips, investing in South Australia has never been so easy.\n
Hon. Tom Koutsantonis MP
Minister for Mineral Resources and Energy\n
www.southaustraliaming.sa.gov.au
South Australia Resources Information Geoserver (SARIG)

WINNER

Geospatial Category in the 2013 Australian Government Excellence in eGovernment Awards

http://www.minerals.dmitre.sa.gov.au
Mineral Exploration in South Australia
2012/13 Report

• Company exploration data releases outlining successful discovery of diverse range of mineral commodities

• Comprehensive statistical analysis of mineral exploration expenditure in South Australia

• Overview of opportunities for investors

• Download from website http://www.minerals.dmitre.sa.gov.au
Program for Accelerated Exploration (PACE)

minerals.pir.sa.gov.au/pace2020
South Australia – Key Points

• Proven Minerals prospectivity
• New Exploration Frontiers and Opportunities
  – especially under deep cover
• Joint venture opportunities for many existing projects
• Supportive Government – PACE initiative
  – Free Pre-competitive geoscience information
  – Co-funded drilling and collaborative surveys
  – Streamline Approvals
  – Best Practice Regulation
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Murphy's "Haystacks" (Photo: S.Hill)