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Upstream and Downstream Opportunities created by the Mining Industry:

Case of Sulphuric Acid Production by Namibia Custom Smelters

Namibia Mining Expo and Conference / 22-23 May 2013 / Windhoek

Overview

- This presentation will cover the following subjects:
  a) *History of the Tsumeb Smelter.*
  b) *Acquisition of the Smelter by Dundee Precious Metals Inc.*
  c) *Development and construction of a high-tech sulphuric acid plant at the Smelter.*
  d) *Economic benefits of the acid plant.*

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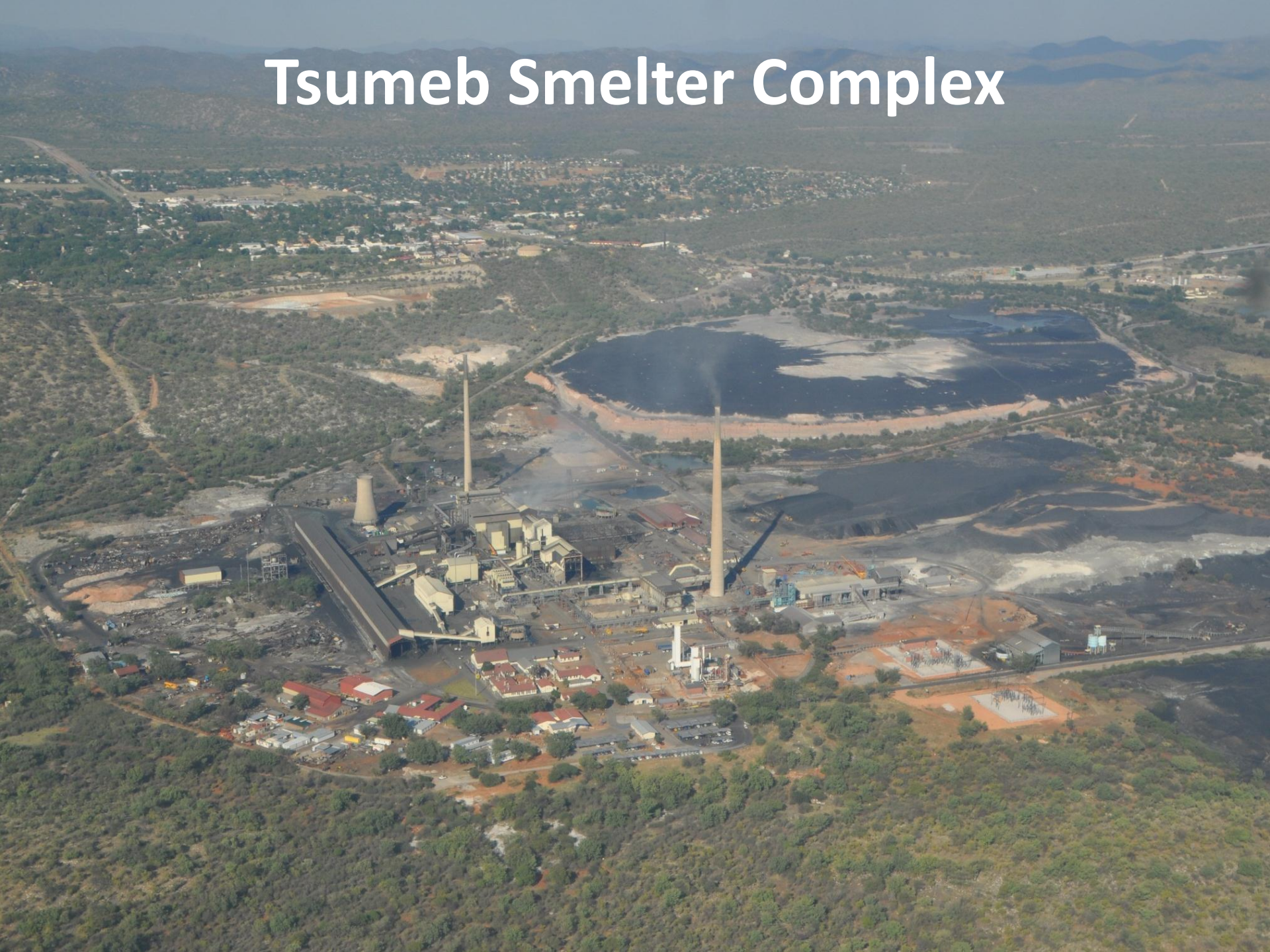
Tsumeb Smelter Complex



History of the Tsumeb Smelter

- Built in 1960-62 by Newmont Mining Corp (TCL). Commissioned 1963. Smelter is 50 years old.
- Designed specifically to treat complex polymetallic ores from Tsumeb Mine (containing copper, lead, zinc, arsenic, cadmium).
- Environmental and health challenges during the '80s and '90s. Pb, As and SO_2 emissions above international standards for years.
- Ausmelt furnace built/commissioned in 1996. Lead-smelting furnace: idea was to address environmental issues.
- TCL liquidated in 1998. Government faced environmental liabilities of Smelter.
- Ongopolo Mining and Processing Ltd. reopened operations in 2000.

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History of the Tsumeb Smelter

- OMPL unable to invest capital to ensure long-term sustainability; provisional liquidation in 2006.
- Weatherly purchased company in 2006. Again limited funds available – Smelter starved from investment to address environmental issues.
- Namibia's copper mines closed in 2008 – Weatherly unable to survive slump in copper price.
- DPM assisted Smelter financially to stave off closure in 2008.
- Ausmelt recommissioned 2008 – received funds from DPM to convert furnace to a copper smelter.

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DPM Interest in the Tsumeb Smelter

- DPM unable to obtain license in Bulgaria to process Chelopech concentrate. Reason: would require a cyanide-leaching process; EU banned cyanide processes.
- Chelopech concentrate high in copper, gold, and arsenic – very similar to Tsumeb and Khusib Springs copper concentrates treated at the Tsumeb Smelter for years.
- DPM looked at various smelters in the world to find a home for its concentrate; wanted to purchase a facility already in operation.

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DPM Interest in the Tsumeb Smelter

- Tsumeb previously treated Chelopech concentrate supplied by trader Louis Dreyfus doing business with Weatherly.
- Due diligence on the Tsumeb Smelter confirmed it could treat Chelopech concentrate. DPM realized huge investment necessary to upgrade Smelter; found investment climate in Namibia suitable.
- DPM purchased NCS from Weatherly Mining in March 2010.

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Issues When DPM Took Over

- Very little capital invested previous 10 years.
- Shortage of skilled staff.
- Demotivated and underpaid workforce.
- Poor emission controls on furnaces.
- Insufficient working capital.
- Historical dusts/contaminants at Smelter.
- Lack of safety, health and environmental protocols.

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NCS Strategic Priorities

Convert Smelter to world-class facility by improving safety, health and environmental conditions.

Convert Smelter to world-class facility by improving safety, health and environmental conditions.

Capitalise on the Tsumeb Smelter's unique capability to process complex concentrates.

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Projects

- To achieve the objectives, Project 2012 was launched to address environmental issues and increase production to a throughput of 240,000 tpa concentrate:
  - *New baghouses and fume-extraction systems introduced.*
  - *Dust-handling improved.*
  - *Arsenic Plant upgraded.*
  - *Second oxygen plant constructed.*
  - *Reduction in SO_2 emissions.*

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Acid Plant

- Government directive to reduce SO_2 emission levels accelerated timetable for NCS strategic plan.
- Plant to be completed by the third quarter of 2014.

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The Future

Acid Plant

Acid Plant Technology

- Awarded project to Outotec (bids received from SNCL, Outotec).
- Outotec owns the Lurgi technology – most commonly used for sulphuric acid production from sulphur dioxide-rich off-gases.
- All off-gases collected.
- 99 percent conversion of SO_2 to acid.
- Acid quality good enough to be sold on international market.

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Acid Plant Capital

- Total capital:

  - **Contract** **USD 196.6 million**
  - **Owners** **USD 7.9 million**
  - **Total** **USD 204.5 million**

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Acid Plant Construction

- Engineering complexity and challenges
  - *Brownfields refit requires operations and project to run unimpeded.*
  - *Significant plant infrastructure required.*
- Operating challenges
  - *Acid plant MUST operate while smelter is running.*
  - *Acid MUST be transported.*
  - *On-site storage tanks must have capacity at all times.*
  - *Rail transport risks.*

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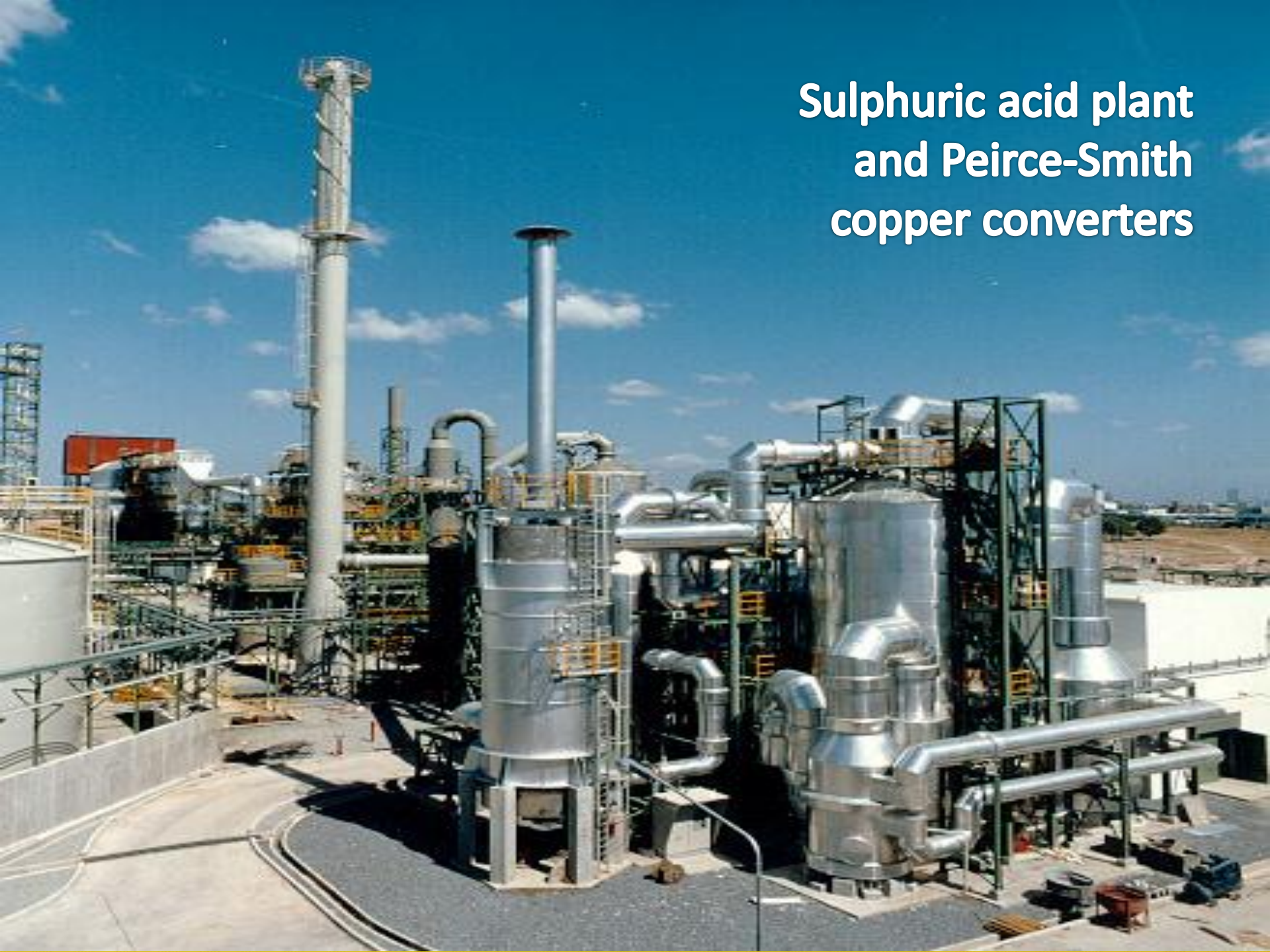
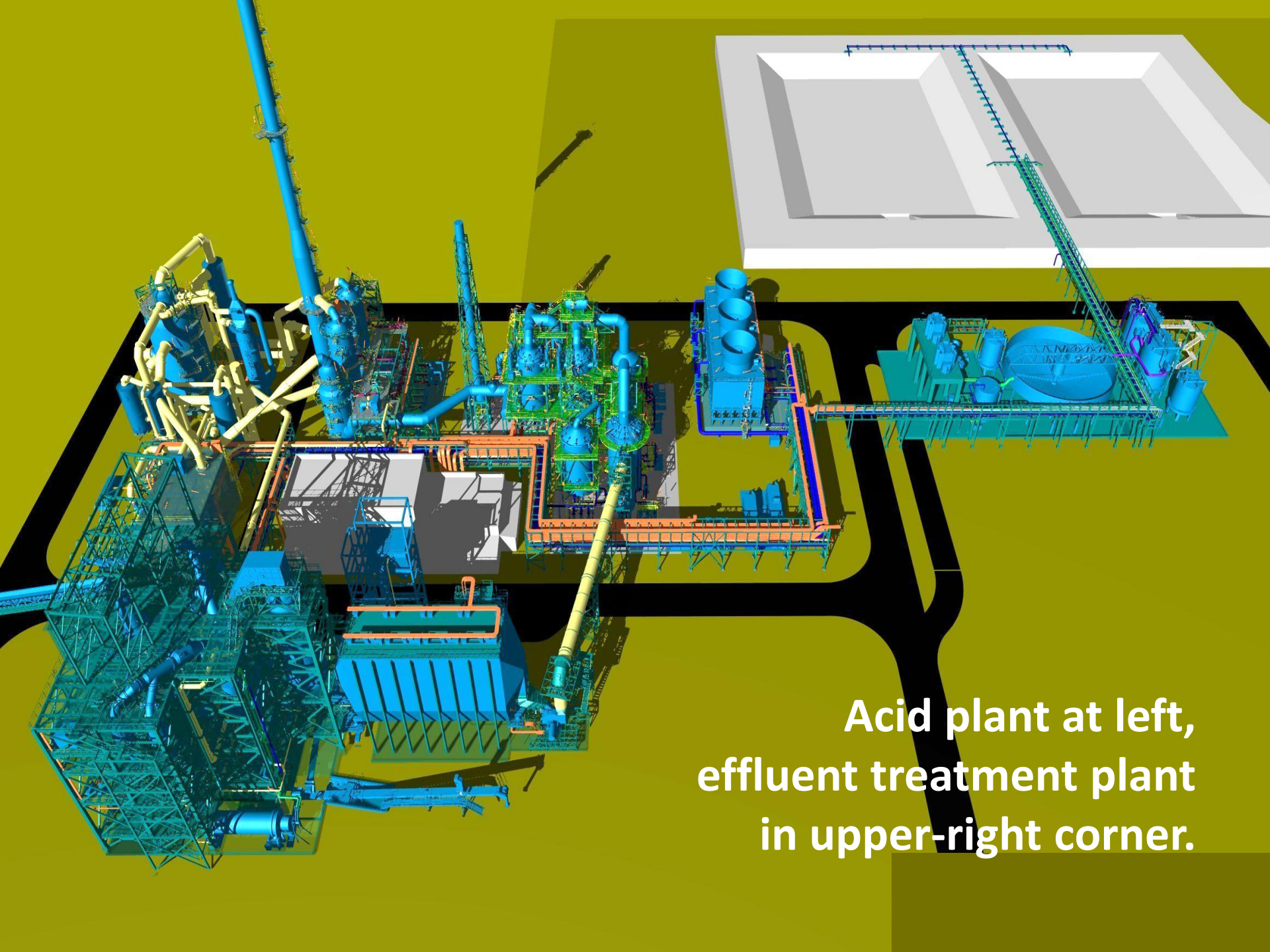
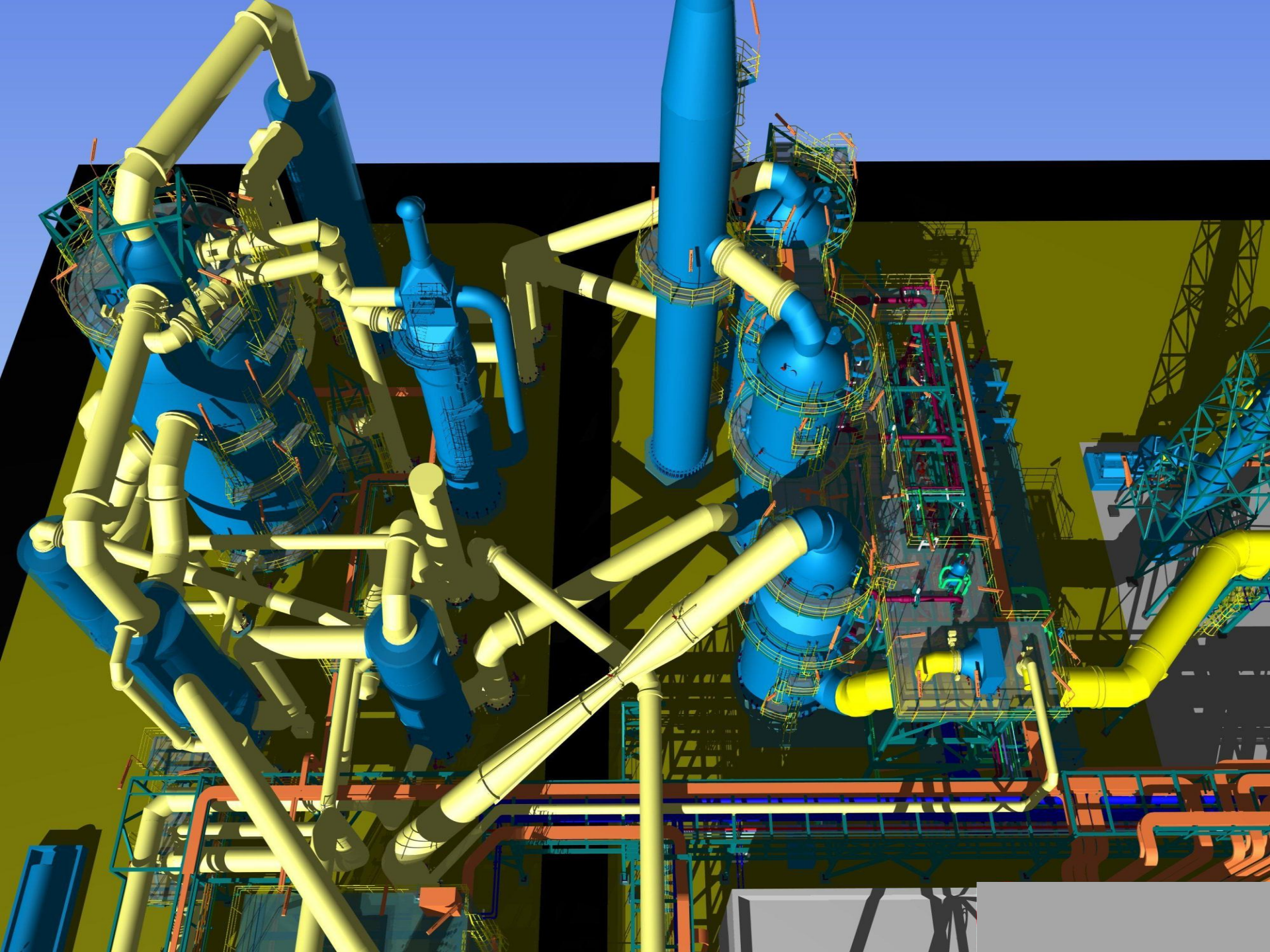
Sulphuric acid plant and Peirce-Smith copper converters, including converter hoods.

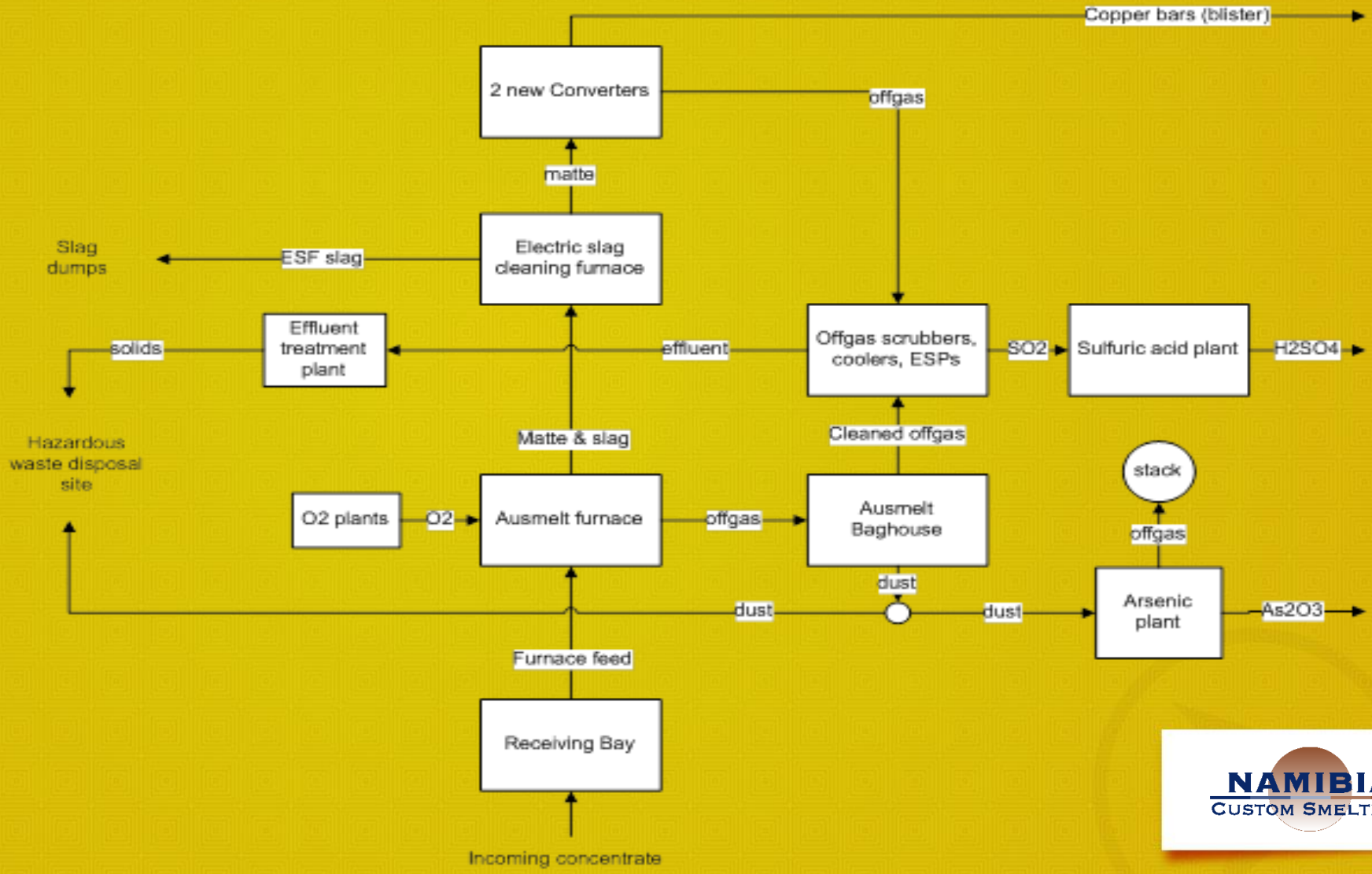

Sulphuric acid plant
and Peirce-Smith
copper converters

Sulphuric acid plant and Peirce-Smith copper converters.


Acid plant at left,
effluent treatment plant
in upper-right corner.



Future Flowsheet



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Acid Plant Capacity

- Anticipated production: 240 ktpa to 350 ktpa.
- Depends on sulphur content of concentrates smelted.
- 30,000 ton on-site storage and rail facility.
- Currently not anticipating Walvis Bay facility.

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Acid Market Strategy

- Protea Chemicals brought in as supply-chain managers.
- NCS signed MOU with Rössing Uranium (Rio Tinto) in December 2012; currently finalising off-take agreement for 220 ktpa.
- NCS signed MOU with Weatherly, which intends to reopen Tschudi Mine (leaching and SXEW processes, requires 30-40 ktpa).
- Any excess acid to be sold on international market.

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Acid Market Challenges

- Rail infrastructure between Tsumeb and Rössing – MoT has approved funds to make repairs, upgrades.
- Envisaged to be completed by June 2014.
- Ability of TransNamib to transport 240-300 ktpa acid – rolling stock must be purchased.
- Concerns around TransNamib's management ability.

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Acid Market Challenges

- Competing against international market prices – will sell acid locally at discount prices to make it more attractive.
- At current market prices, can only recover transport and partial operating costs; no return on investment.
- Difficult to determine long-term acid price – surplus to be sold on international market.

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Benefits to Local Economy

- > 600 jobs available during construction – 75 percent to be filled by Namibians.
- Major boost to local (Tsumeb) economy.
- Temporary construction camp to accommodate more than 300 contractors (Namibian catering company).
- SMEs to benefit: building, plumbing, cleaning etc.

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Benefits to Local Economy

- Training and transfer of specific skills to Namibians.
- > 50 permanent positions to be created to operate plant.
- Tschudi Mine project more viable (cheaper acid for leaching purposes).

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Benefits to Namibia's Economy

- Value-added product produced locally.
- One of few products produced locally and sold for further use in country.
- Revenue generated remains in Namibia – product bought locally instead off-shore.
- Additional job creation.

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Benefits to Namibia's Economy

- Parastatals to benefit:
  - *TransNamib to transport more than 240 kt acid per annum (additional revenue).*
  - *Nampower to provide additional 6 MW of electricity for Acid Plant.*

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Conclusion

An environmental challenge has become an economic opportunity!

Thank you.

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