Country Update South Africa

Presentation Outline

- Recent Developments
- Pilot Projects
- Lessons Learnt

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Funding

- Budget for 2015-16 Financial Year –USD 6.7 million from DST (Govt.)

- USD 825k leveraged from the Technology Innovation Agency (TIA) for a HySA Telco Module Project
- The Department of Trade and Industry supporting fuel cell projects

- Supply challenges with the National Grid have opened up a window of opportunity for alternative energy solutions including fuel cells

- Debate is focusing on reliability and availability of supply rather than the high operating costs of diesel

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Energy Policy discussion

- National Planning Commission (NPC) commissioner Tasneem Essop has highlighted a growing global movement against the continued use of coal as a source of energy, telling a panel discussion on Monday that South Africa's coal-fired power station build programme and continued reliance on fossil fuels was, to some extent, the result of the entrenchment of the interest of large mineral resources firms in government.
- "The introduction of democracy [in 1994] was not the end of entrenched interests of those that control the mineral resources and we [still] don't know how to structure our economy in a way that we can evolve away from a dependence [on coal]," she commented during an energy forum in Johannesburg organised by policy think tank Friedrich Ebert Stiftung and the South African Civil Society Information Service.

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http://www.engineeringnews.co.za/ 2015-05-26

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Recent Activities

JOHANNESBURG (miningweekly.com) – Fuel cell electric vehicles will allow platinum mining to build its future in a truly sustainable way on the back of zero exhaust emissions and the use of the world's endless supply of hydrogen as a fuel source, Anglo American Platinum (Amplats) CEO **Chris Griffith** has told Platinum Week 2015 in London.

Griffith said this against the background of Hyundai targeting the production of 1 000 ix35 fuel cell vehicles in the UK by the end of this year and other car companies like Toyota and Honda also having launch plans. Highlighting the need for continuous industry collaboration with customers and non-traditional partners to develop uses for platinum-group metals (PGMs), Griffith outlined that if fuel cell cars succeeded in dominating the electric vehicle segment in Europe, platinum demand within Europe would rise to 6.6-million ounces in 2050.

However, a feared "infrastructure war" with alternative fuel technologies is prompting the platinum sector to make strong calls for more infrastructure collaboration across a broader front to put fuel cell technology on the front foot.

http://m.miningweekly.com/-2015-05-25

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Recent Activities

Implats surges ahead with platinum fuel cell power

Impala Platinum (Implats) CEO Terence Goodlace is championing the marketing of platinum by surging ahead with plans to use platinum fuel cells to produce electricity at the Implats platinum refinery in Springs, on Gauteng's East Rand. JSE-listed Implats, which is heavily supported by the strong black-owned shareholding of the Bafokeng community, is flying the platinum marketing flag high to counter the metal's significant recycling position, which demands ongoing market expansion.

The first phase of the project will see the mining company installing cells using phosphoric acid fuel cell technology from Fuji Electric in Japan. The fuel cells will operate off excess hydrogen piped in for the metal reduction process. The fuel cells will supply an initial **1.8MW** of power in two tranches and will also produce heat that will be integrated into the operation. The second phase of the project will be the installation of a fuel cell facility producing up to **22MW** operating on natural gas and hydrogen that will enable Implats' refinery to operate off the national electricity grid.

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Recent Activities

Launch of the 100kW Phosphoric Acid Fuel Cell System at the Chamber of Mines (CoM) Building (31 March 2015)

- Collaboration between CoM, Dept. of Trade and Industry (the dti) and Mitochondria Energy Company
- Fuel cell sourced from Fuji Electronics uses NG and provides base load to the CoM building.

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Recent Activities

Installation of a 5kW Hydrogen Fuel Cell Backup Power at a Clinic (Minister to launch Project on 7 July 2015)

- Fuel cell used to power vaccine fridges in the event of load shedding in order to preserve the medication

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Recent Activities

HySA Infrastructure developed an Electrochemical Hydrogen Compressor (EHC). The energy efficient compressor reduces the energy required to compress hydrogen generated by polymer electrolyte membrane (PEM) water electrolysis. These systems can, thus, be deployed using existing renewable-energy technologies as the primary sources of energy. The compressor has no moving parts and uses platinum as a catalyst. The DST and platinum major Anglo American Platinum fund the project. Compressors with moving parts use more energy and are prone to mechanical friction, oil contamination, as well as other problems. As this compressor is based on solid-state ionic conductors, it is silent in operation and uses less energy.
http://www.engineeringnews.co.za 2015-02-20

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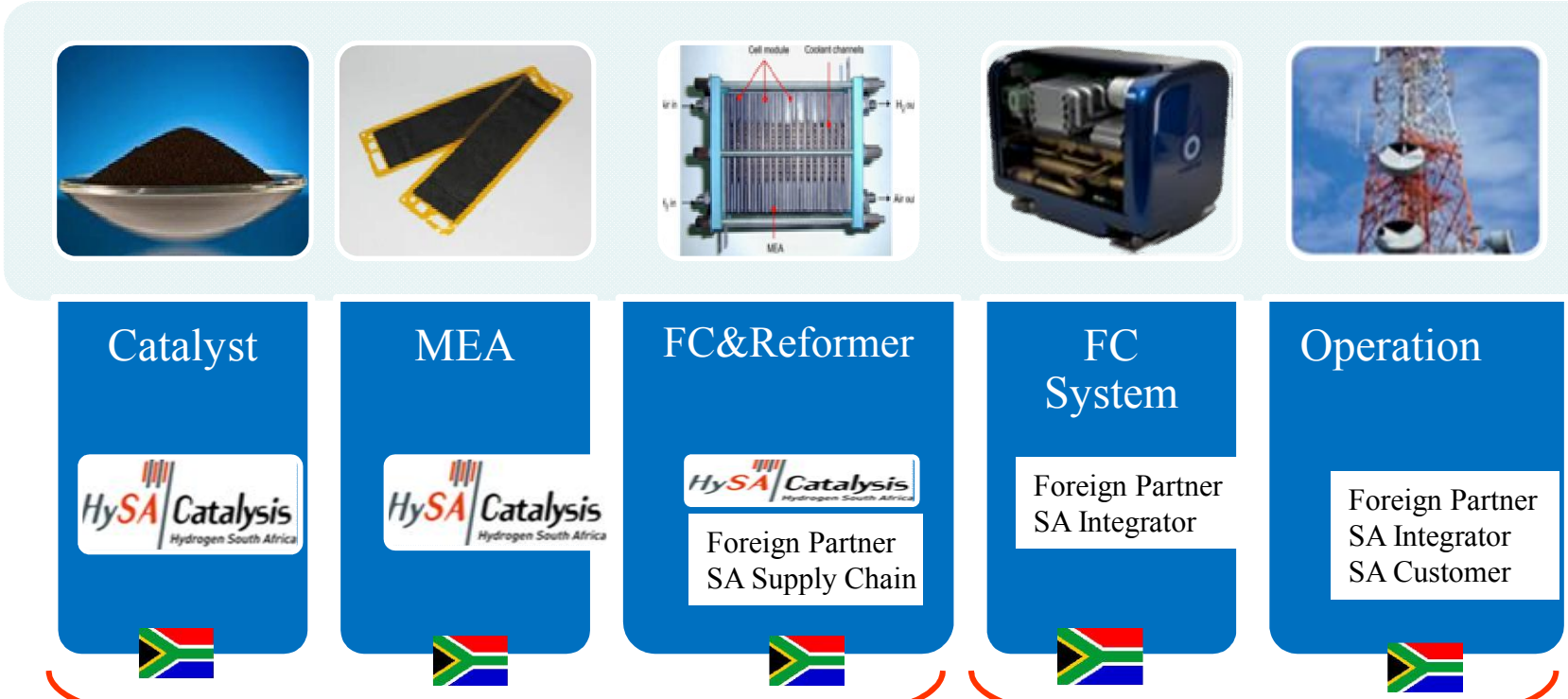

- HySA/Catalysis
  - Initiated a telco power module trial in collaboration with local and international partners
  - Project will enable HySA Catalysis to understand requirements
  - Upon meeting customer requirements HySA Catalysis will deliver catalysts and/or MEA and/or fuel cell stack to customer

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Lessons Learnt

- Policy framework required to drive the HFCT initiative
- Strategic selection of pilot projects based on impact is critical in bringing awareness of fuel cell technology e.g. off grid rural electrification project, fuel cells in rural schools, fuel cells in health facilities
- Multi-stakeholder projects have a better chance of success provided objectives are in alignment
- Government investment in infrastructure is necessary to stimulate the market and unlock potential application areas
- Market will make the technology choice that makes economic sense
- Challenges exist with all the fuel choices
- Initial markets for SA are in Telco, rural electrification and Mining applications.

Thank you

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