



# Bushveld Energy Our Localisation Strategy

FEBRUARY 2022

# Bushveld Energy Overview – South Africa



**Long-Duration Energy Storage Solutions Provider**



**Deployment**

- Self generation opportunity of >125 MW of solar PV and 180 MWh of battery ESS<sup>4</sup>.
- Collaborative Market Development of VFRB projects.



**Manufacturing**

- Invested in 2 OEMs<sup>1</sup>, Enerox<sup>2</sup> and Invinity<sup>3</sup>.
- Support local VFRB assembly in South Africa.



**Electrolyte Fund**

- Electrolyte = no degradation + captured Vanadium value = high residual value.
- Fund leases electrolyte to project = reduced Levelised Cost of Storage.



**Electrolyte Manufacturing**

- Building a 200 MWh capacity electrolyte (~1,100 mtVp.a) manufacturing facility in East London.



**Processing**

- 2 low cost processing facilities.



**Mining**

- Large, high grade, JORC compliant resource (~550 Mt grading ~1.6%-2.0% V<sub>2</sub>O<sub>5</sub>).
- 3 deposits, serviced with logistics infrastructure.

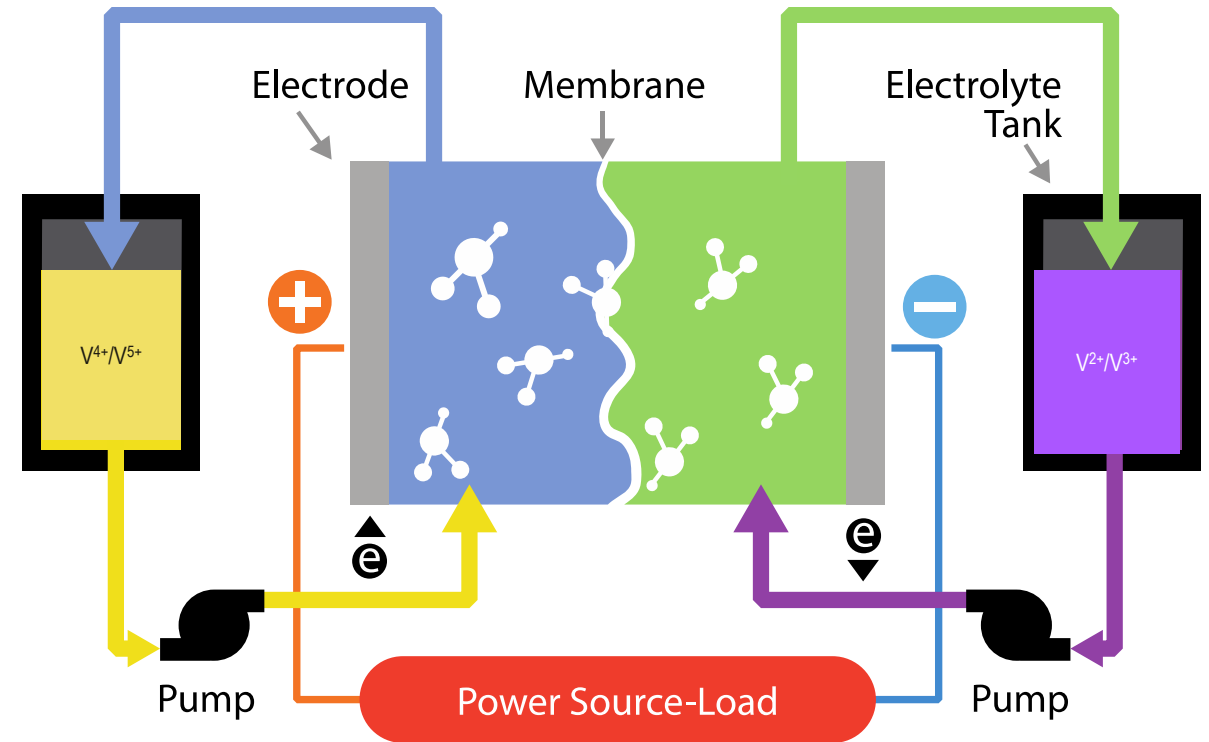


**Low cost, vertically integrated primary vanadium producer**

1. OEMs: Original equipment manufacturers. 2. Enerox: Enerox GmbH ; 3. Invinity: Invinity Energy Systems; 4. ESS: Energy storage System

# The VRFBs - simple and robust - hundreds of installations globally

- The flow battery was first developed by NASA in the 1970s and unlike conventional batteries, the liquid electrolytes are stored in separated storage tanks, not in the power cell of the battery
- During operation these electrolytes are pumped through a stack of power cells, or membrane, where a reversible oxidation (“redox”) electrochemical reaction takes place, charging or discharging the battery
- Vanadium can exist in four different states, allowing for a single element to be used to store energy. Vanadium was first used in flow batteries in the mid-1980’s
- In addition to vanadium, the electrolyte consists primarily of water and chemical additive acids such as sulphuric acid or hydrochloric acid



# BELCO – The VRFB electrolyte manufacturing company



- › JV between Bushveld Energy and the IDC.
- › EPC Contractor to construct an 8 000 000 liter p.a. vanadium electrolyte plant at the East London IDZ.





# Current Progress Site Construction





# Current Progress Site Construction





# Current Progress Site Construction



# Current Progress Site Construction





Our 4,5 MWp solar and 1 MW/ 4 MWh Vametco hybrid mini-grid (visualisation)



Thank you



**BUSHVELD**  
ENERGY  
Hybrid Mini Grid  
- 3.5 MWp Solar PV  
- 1 MW/4 MWh Vanadium Redox Flow  
Battery