

Vanadium Supply for VRB Applications

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90% of vanadium consumption today occurs in the steel industry. 10% of vanadium consumption today occurs within the titanium alloys, super alloys, chemical applications and energy storage applications where quality requirements are typically more rigorous. Within these special applications quality requirements vary significantly by application.

The vanadium production base has developed process capabilities and product quality standards to meet the requirements of the steel industry. Only a small portion of the current vanadium production capacity is able to make high purity vanadium compounds, and this situation has been aggravated with the recent exit from the vanadium business of several producers of high purity compounds. Among the small percentage of vanadium producers who can efficiently produce higher purity vanadium compounds there are some significant differences in purity and trace element levels within their products.

Today consumption of vanadium in VRB and other energy storage applications represents a very small percent of total demand, but this could grow dramatically in the coming years. At least one sourceⁱ projects vanadium demand in energy storage applications could total more than 32,000 metric tons of vanadium per year by 2020:

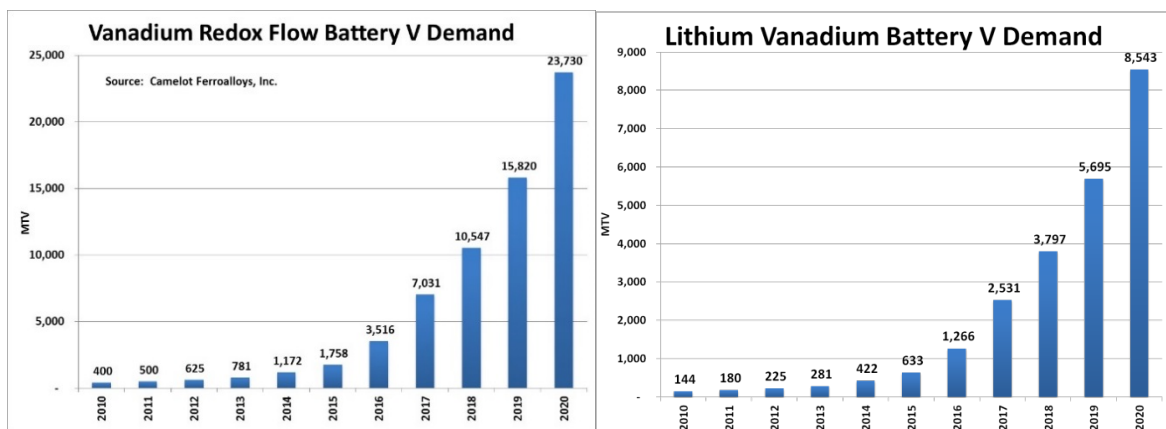


Figure 1: VRB V Demand Projection

Figure 2: Li Battery V Demand Projection

Summary

- Only a very small percent of the global vanadium supply base is capable of producing “high purity” vanadium compounds which may be necessary for future VRB system applications
- Potential new demand in VRB’s could result a significant increase in demand for high purity vanadium compounds
- There is a need for dialog among vanadium producers and VRB developers regarding the potential quality and quantity requirements for vanadium in VRB systems today and in the future

ⁱ Kevin Jones, Camelot Coal, Ryans Notes Ferroalloys Conference presentation, Oct. 30, 2012 Miami, FL USA