



# AMERICAN VANADIUM

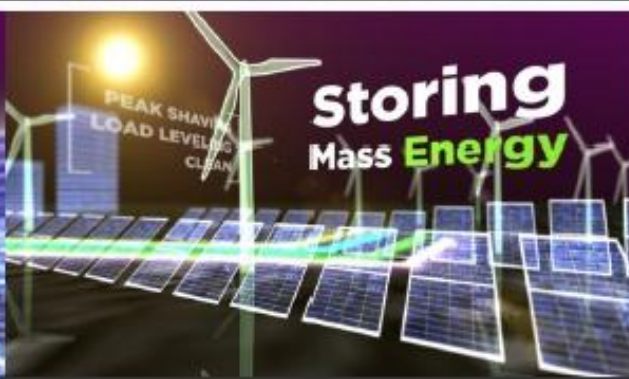
THE CRITICAL ELEMENT

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Bill Radvak President & CEO

July 25, 2011

TSX.V: **AVC**





# Safe Harbour

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Forward-looking statements involve inherent risks and uncertainties. We caution you that a number of important factors could cause actual results to differ materially from those contained in any forward-looking statement.



# Board of Directors



**Brian McAlister, BS** *Chairman*

Brian McAlister is the President of Cornet Capital Corporation, a company owned and controlled by Mr. McAlister, which is engaged in the business of assisting start-up corporations with capital raising, funding and other consulting activities. Over the past 27 years, Mr. McAlister has assisted in excess of 25 early stage companies in varied industries including biotechnology, enterprise software, and natural resources. Mr. McAlister holds a Bachelor of Science Degree (1979) with a major in Finance from the University of Denver.



**Brian Bayley,** *Director*

With over 25 years of business experience, Mr. Bayley has extensive knowledge in areas of asset backed lending, real estate, corporate restructuring and natural resources. Brian E. Bayley is currently a Director and Resource Lending Advisor of Sprott Resource Lending Corp. (formerly Quest Capital Corp.), a TSX Exchange and NYSE Amex listed resource lending corporation. Previously, he was President and CEO of Quest Capital Corp. Mr. Bayley holds an MBA from Queen's University. Mr. Bayley is currently a director and/or officer on numerous other public companies.



**Alan Branham, PhD** *Director*

Alan Branham has more than 20 years of international exploration experience, most recently as President of Midway Gold Corp. Prior to Midway, Mr. Branham was a senior geologist with Newmont Mining Corp. Mr. Branham earned a Masters of Science Degree in Economic Geology from Washington State University, a Bachelor Degree from Stanford University, California, and has participated in successful exploration projects in the Southwestern United States, Mexico and Central America. Mr. Branham was involved with the discovery of several world-class gold deposits in the Carlin Trend in Nevada.



**George Hawes** *Director*

Mr. Hawes is a private investor and is President of G.T. Hawes & Co., a private New York real estate and investment company. He is currently a Director of Proginet Corporation, an enterprise security software company, and is a Director of Midway Gold Corp., a gold exploration and development company.



**Dr E Kelly Hyslop** *Director*

Dr. Hyslop is retired after 25 years as a Physician and Clinical Professor in the Department of Medicine at UBC. He has also taught non-seismic geophysics and geochemistry to the oil industry when with Barringer Research for 12 years. He is and has been involved in multiple startup, Earth Science and Biotechnology companies, generally raising capital and advising in the inter-phase between science and finance; and then involved on the Board or Directors of these companies.

# Management



**Bill Radvak, BASc** *President & CEO, Director*

Received a Mining and Mineral Process Engineering Degree (1986) from the University of British Columbia. He joined AVC in January 2010 as President & CEO. Mr. Radvak is a co-founder and past Chief Executive Officer of Response Biomedical, a medical device company he led from its evolution to a 90-employee company and raised in excess of \$50 million in public offerings.



**Michael Doyle, MGeol** *Executive Vice President of Operations*

Has more than 30 years of domestic and international mining experience in surface and underground operations, most recently as Executive Vice President of Allied Nevada Gold Corp. Prior to joining Allied Nevada Gold Mr. Doyle held positions of Senior Vice President of Operations for Kinross Gold Corporation, Vice president and General Manager of Round Mountain Gold Corp, (Kinross-Barrick joint venture), General Manager of Gold Bar operations for Atlas Gold Corp. He graduated in 1977 from the University of California at Santa Barbara with a degree in geology and was the past chairman of the Nevada Mining Association.



**Paul Casey, MBA** *Director of Business Development*

Has over 12 years experience in the highly regulated medical device industry and has managed several large projects from concept to market. His experience is in strategic business planning, business tactics and developing or structuring new businesses partnerships with multinational companies. He has masters degrees in science and business and will be focusing his efforts solely into the vertical integration of our vanadium products into multiple markets.



**Michael Hyslop** *Director of Corporate Development*

Has worked as a licensed stock broker where he focused on venture capital financing in the resource sector. He has consulted for several resource company's since leaving the brokerage community providing advice and support in financings.



**Bob Cross, BASc, MBA** *Advisor*

Has more than 20 years experience as a financier in the mining and oil & gas sectors. Mr. Cross is a co-founder and Non-Executive Chairman of Bankers Petroleum, Non-Executive Chairman of B2Gold, and until October 2007, was the Non-Executive Chairman of Northern Orion Resources. Between 1996 and 1998, Mr. Cross was Chairman and Chief Executive Officer of Yorkton Securities. From 1987 to 1994, he was a Partner, Investment Banking with Gordon Capital. He has an Engineering Degree from the University of Waterloo, and an MBA from Harvard Business School.





# Capital Structure

AVC : TSX		July 25 <sup>th</sup> 2011
Market Capitalization		\$35 million
Issued Shares		25 million
Fully Diluted Shares		31 million
Options		2.2 million between \$0.40 & \$1.64
Warrants		1.2 million @ \$0.40 expire August 2011 0.2 million @ \$1.35 expire March 2012 1.4 million @ \$1.95 expire Sept 2012 0.6 million @ \$2.00 expire January 2013
Working Capital (cash)		\$6.2 million. No debt
Ownership		50% Management and Insiders 10% Institutions





# Project Overview



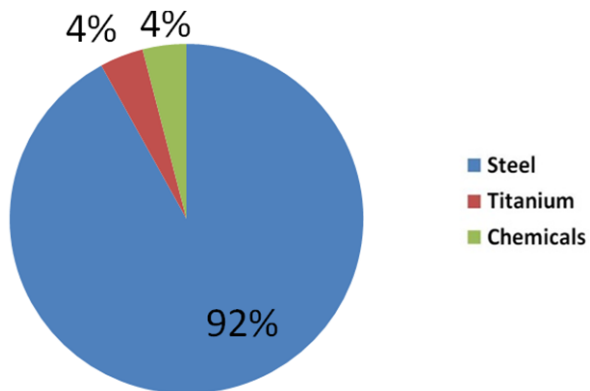
Nevada
Sole US primary producer
End of 2012 production target
5% of global production
Open pit, 0.2 strip ratio
Heap leach
Q3 2011 Final Feasibility Study
* Scoping Study, PEA & NI43-101
AMEC 2008
\$90M Cap Ex
40% After Tax IRR
\$89,000,000 NPV

	Resource	Expansion	Grade	Market Price	Op Cost	Production pa
V <sub>2</sub> O <sub>5</sub>	122 M lbs	366 M lbs	0.339%	\$7.50 /lb	\$3 /lb	14,000,000 lbs



# Vanadium Use

World Vanadium Demand by Application in 2011



## Global Vanadium Consumption

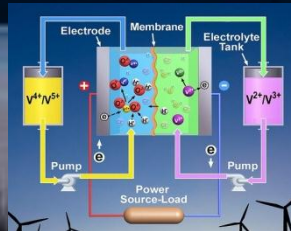
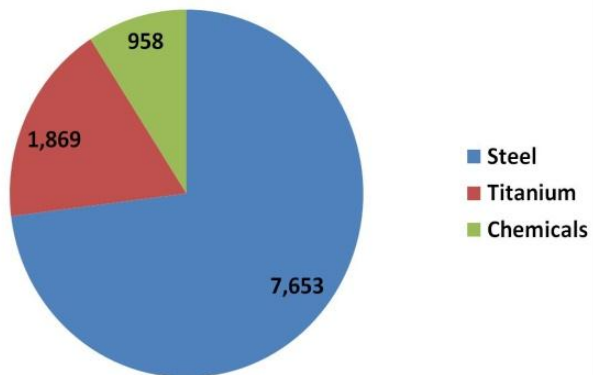
92% High Strength, Low Alloy Steels

4% Titanium Alloys – air frames, jet engines, tools

4% Chemicals – catalysts, sulfuric acid production, Energy Mass Storage

USA Vanadium Demand by Application in 2011

Total Demand 10,480 MTV







# A critical element for the US



## American Steel

- Without Vanadium American steel is uncompetitive and will not meet building codes.



## Aerospace and defense industry

- No known substitute for vanadium used in top titanium alloys.
- Without vanadium the US cannot produce aircraft, missiles, light weight personnel transports and other military and commercial aerospace products.



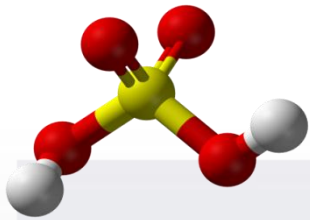
## Chemicals & Pollution Control

- No known substitutes in many catalysts applications for the production of synthetic rubber, polyester, fiberglass, sulfuric acid and other important industrial chemicals.
- Vanadium is a critical component of many pollution control catalysts in removing sulfur dioxide and nitrogen oxide pollutants from gas streams generated by power stations and industrial facilities.
- Without vanadium the production of important industrial chemicals and pollution control catalysts is impossible.



## Grid Scale Electrical Storage

- The Vanadium Redox Batteries offer scalable and long lasting electrical grid storage solution
- Vanadium Redox batteries provide the foundation for almost all green industries such as wind and solar power and the smart grid.



# Vanadium in Steel

*for a greener future*

## High Strength, Low Alloy Steel

### 92% of Vanadium used in HSLA Steels

- 1 lb HSLA = 1.4 lb carbon steel
- Buildings, bridges, cranes, trucks, pipelines, ships, engines

**Strength increased by up to 100%**

**Weight decreased by up to 30%**

*decreased iron ore consumption*

*decreased shipping costs*

*decreased energy consumption*

*decreased manufacturing costs*

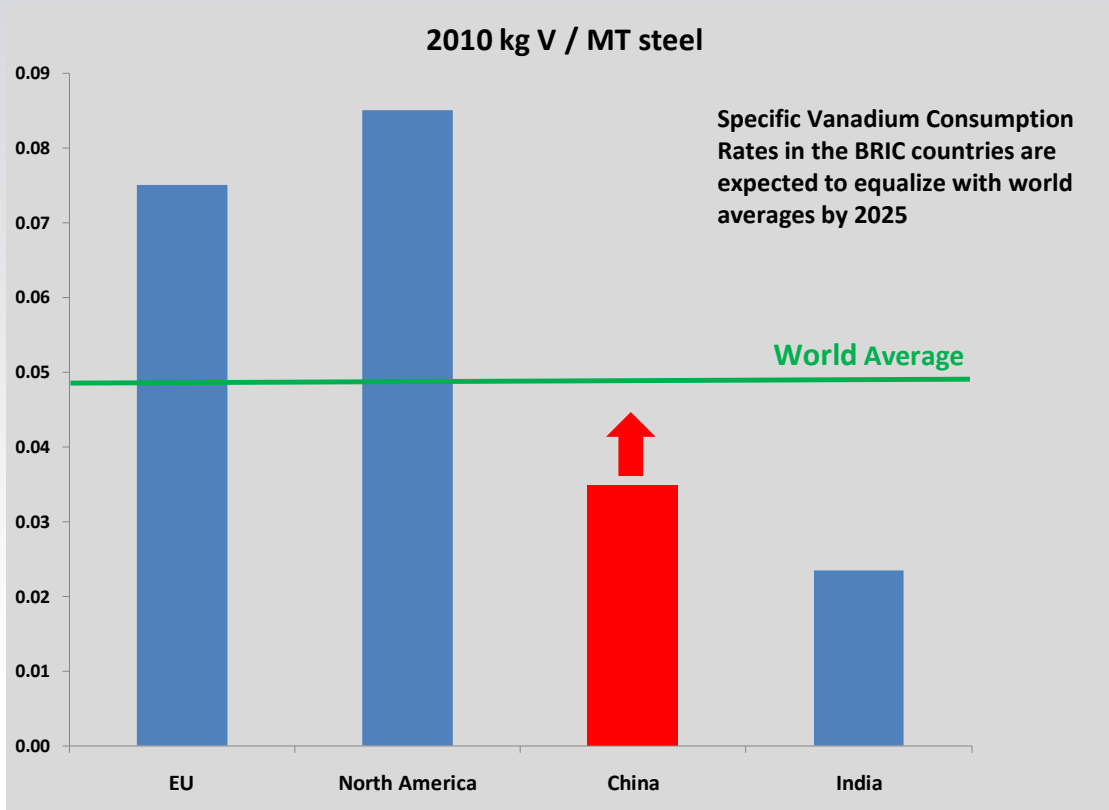
*decreased pollution*

*decreased number of steel mills*





# Steel Regulation



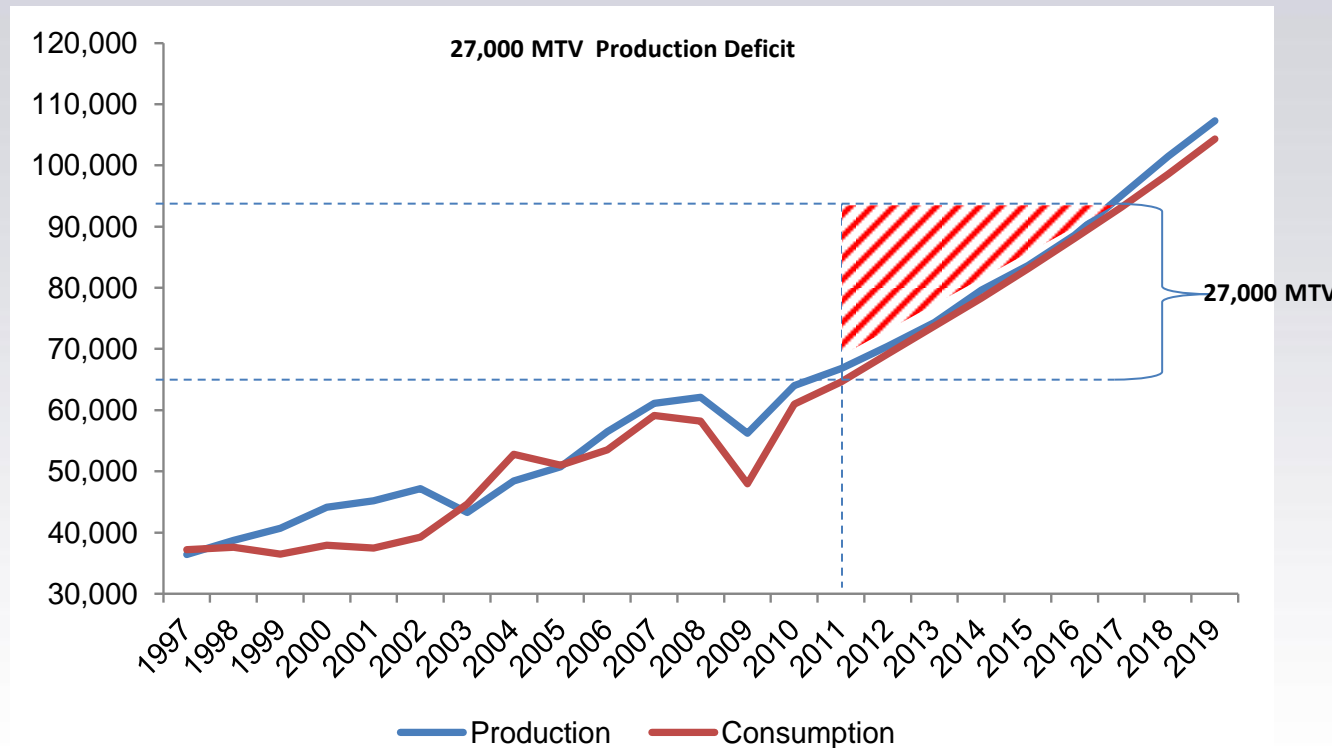
China is making the use of vanadium a key part of its Twelfth, 5 Year Plan

This is expected to drive specific consumption rates and international competition for vanadium dramatically.





# Vanadium Production Shortage



**Chinas Regulation is driving a production shortage of vanadium of 27,000 MTV**

**As of July 1, 2011 any new building designed must incorporate grade 3 or 4 rebar, both of which require vanadium while grade 2 does not.**

**This equates to an additional 27,000 MTV per year demand of vanadium. This is a global increase of about 40% and underlines the fact that production will not meet required consumption levels until 2017.**

# Vanadium in Energy Storage

*for a greener future*



President Obama



*“Vanadium Redox Fuel cell”  
“that’s one of the coolest thing  
I’ve ever said out loud”*

Forum on small business: Closing session  
Cleveland, OH, Feb 22, 2011



# Fixing the Grid

*“The world’s largest supply chain without a warehouse”*



## Problem

- **No Grid Storage Capability**
- Massive storage capability required for Off-Peak usage to manage base load power balancing
- Grid Power surging with solar and wind
- Huge Grid replacement/upgrade costs
- Smart Grid Upgrade requires storage to be economically effective.

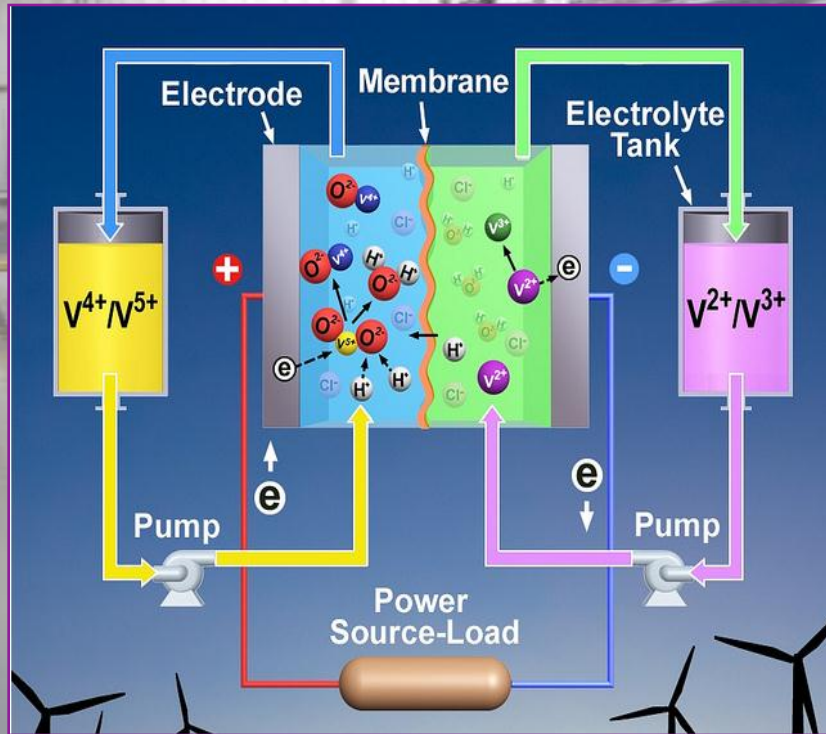
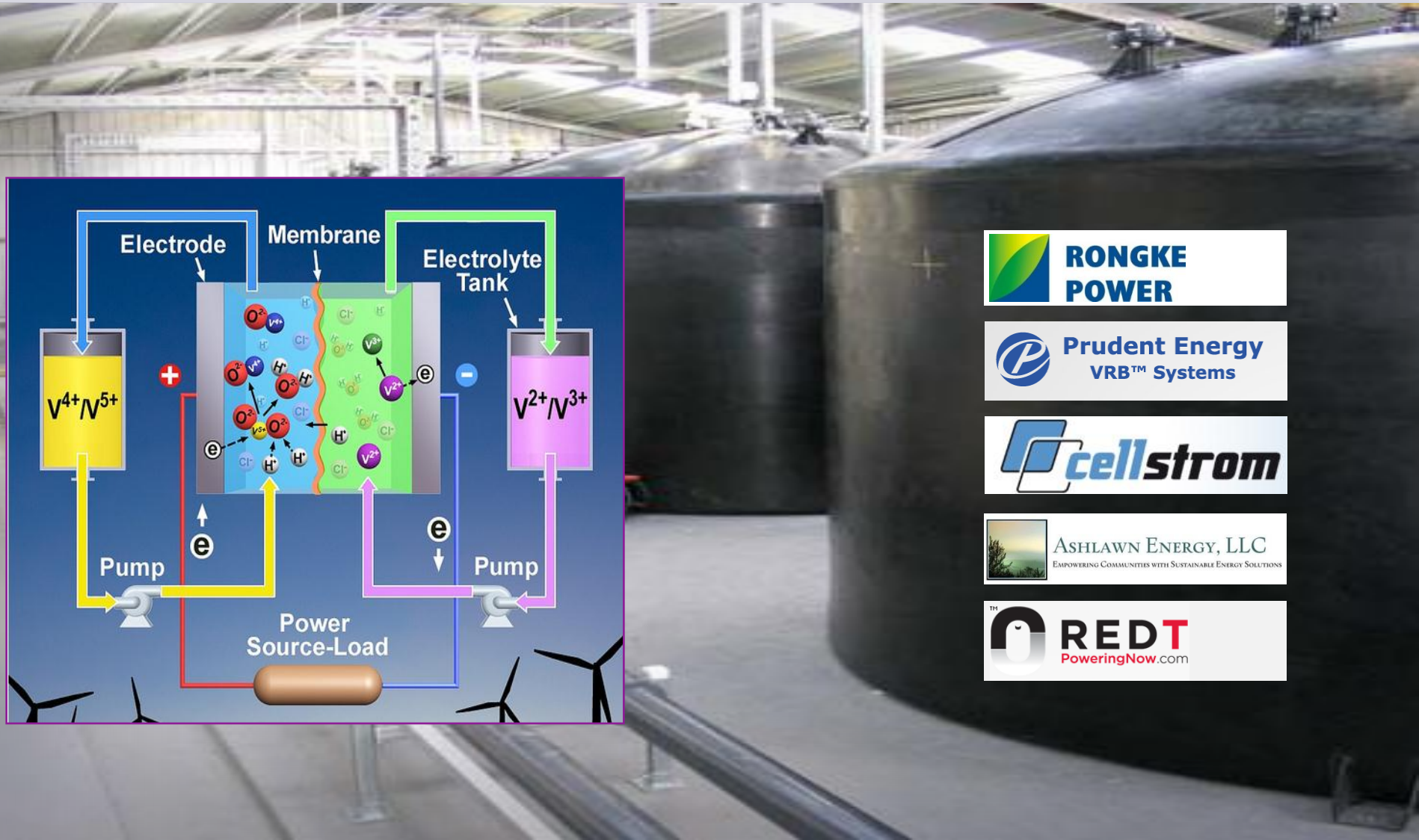
## Solution

- **Vanadium Redox Batteries (VRB's)**
- *>20 year battery life.* Only battery that rapidly charges and discharges with little effect on battery life
- *No limit on size.* Huge scalability potential
- *> 10,000 cycles per battery.* No chemical reaction - batteries do not degrade or get "consumed" over time
- Scalable solution
- High volumes of vanadium required



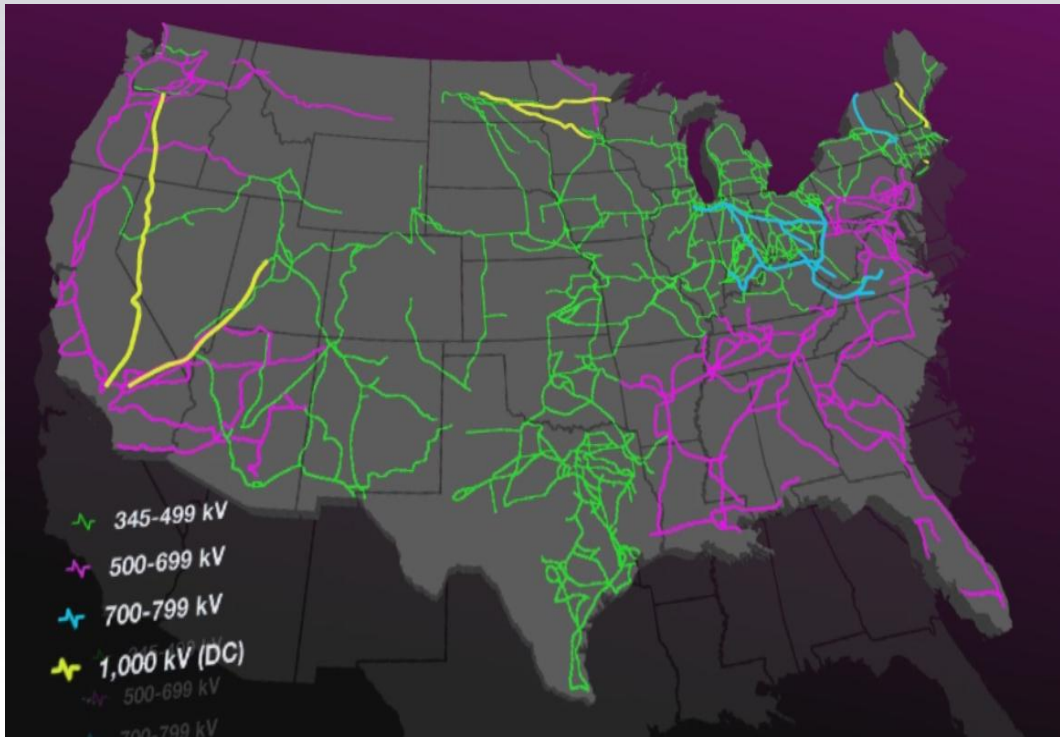


# Vanadium Redox Battery





# VRB Power Grid Application



- Add local capacity
  - Eliminate need to increase size of power generation to only meet peak demand
    - Power generation scaled to average demand
    - Peak demand satisfied with storage
  - Reduce need to send excess power down the lines just in case it is needed. Unexpected demand drawn from storage
  - Buy cheap power based on time of day and store

## Energy Storage in California

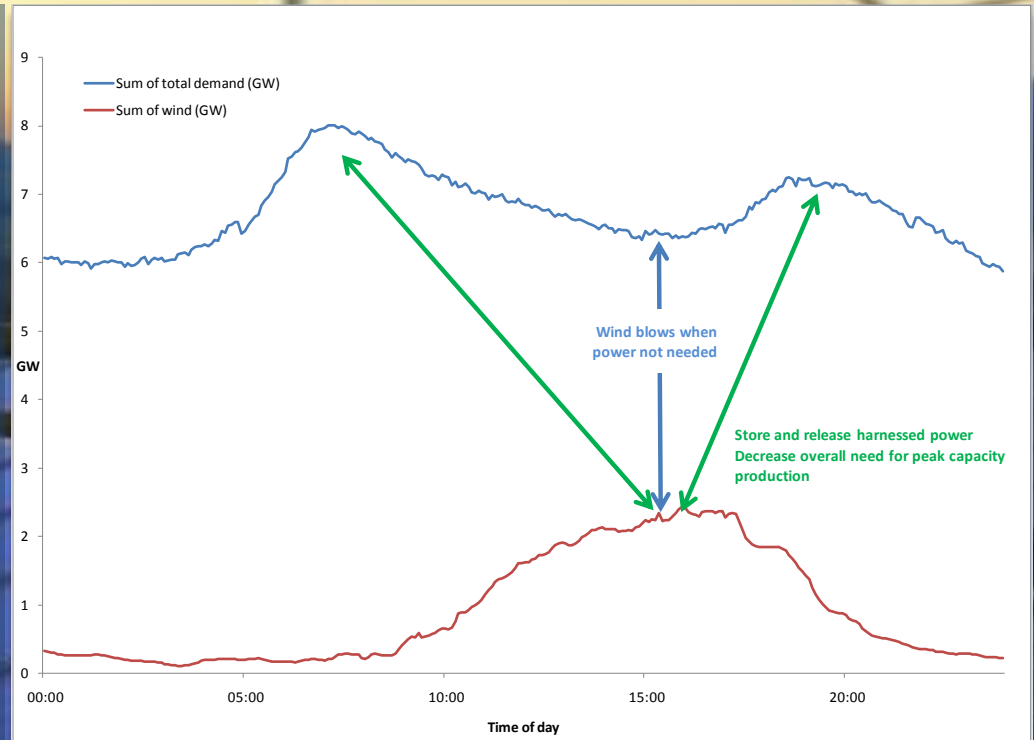
Average annual electricity usage is > 270,000 GWH

Average peak daily demand is about 65,000 MW

AB 2514 has now passed in California – Energy storage targets.

# VRB Renewable Energy Application

- Eliminate intermittent supply issues by storing and releasing as needed
- Store when spot rates are low and sell when they are high
- EIA predicts wind and solar production will be 777 B kWh by 2015
  - Assume 1% in storage
- Vanadium required would be about 160,000 MT or about 2.3X the 2010 production

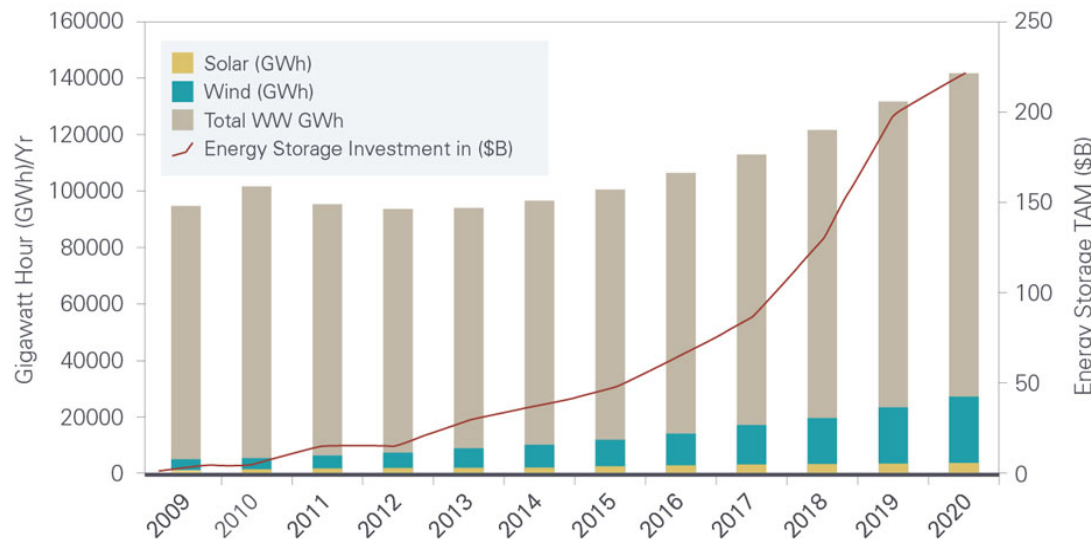






# Grid Level Energy Storage

## Market Potential for Energy Storage



Data Source: Piper Jaffray, World Wind Energy Association, EPIA

- Estimated Energy Storage Investments are expected to reach \$225 Billion by 2020
- This investment not only is expected to save immense capital replacement and upgrade costs of the grid, but is expected to yield returns through increased energy efficiency in the grid.
- Currently the US government Subsidies the inefficiency's



# VRBs and China



On June 4, researchers at the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences report that a vanadium redox flow battery for grid storage has been in operation for 1,429 days with a total running time of more than 34,000 hours and 10,000 charge/discharge cycles.

This is the second vanadium flow system to attain the 10,000 charge/discharge mark, the first one being done by Sumitomo Electric in Japan.



DICP Symposium  
Stationary Energy Storage Technology and Policies June 2011



# Vanadium in Car Batteries

*for greater performance*



Subaru G4E Concept



Audi A2



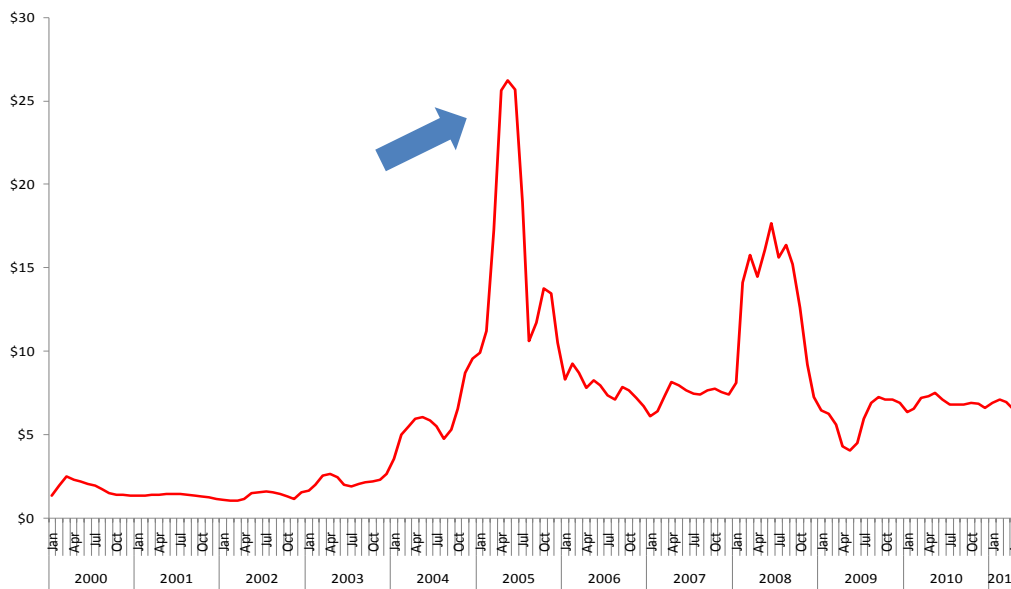
Cathode	Voltage (V)	Energy (kWh/kg)	Cost (\$, relative)
$\text{LiCoO}_2$	3.7	0.518	1
$\text{LiMn}_2\text{O}_4$	4	0.4	0.04
$\text{LiFePO}_4$	3.3	0.495	0.03
$\text{Li}_2\text{FePO}_4\text{F}$	3.6	0.414	0.08
$\text{Li}_3\text{V}_2(\text{PO}_4)_3$	4.8	0.624	0.4
$\text{LiVPO}_4\text{F}$	4.1	0.492	0.84



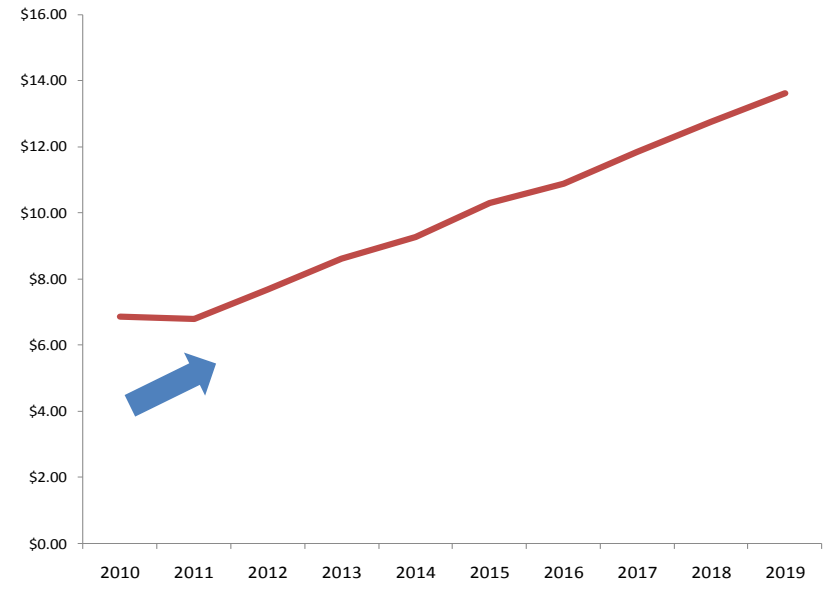
# Vanadium Price Forecast

Only based on Steel use

Monthly average V2O5 price



\$US/lb V2O5



**Previous attempts of regulate steel production resulted in dramatic price spike in 2005.**

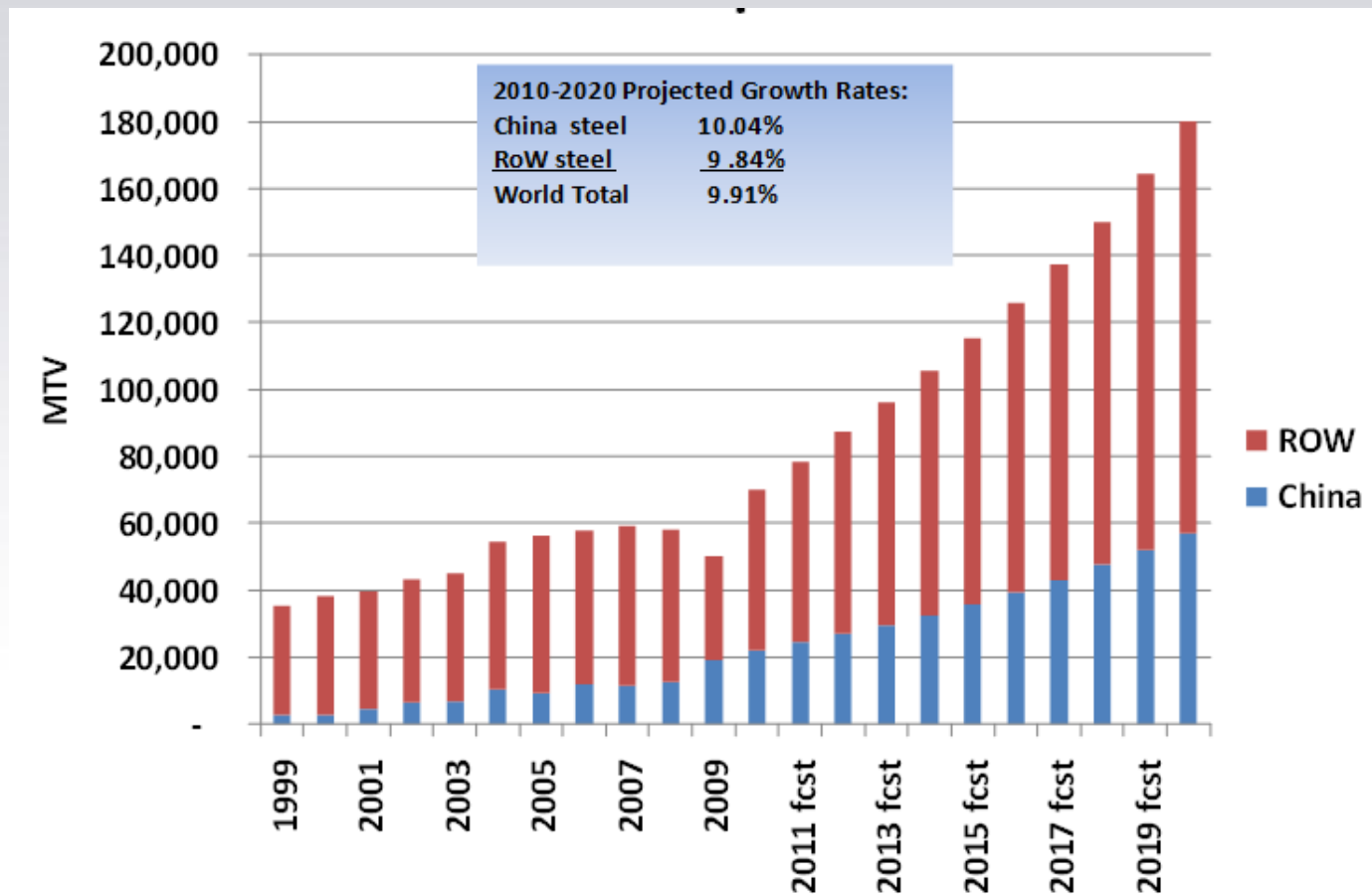
**China was unable to commit to regulation as a result of lack of supply**

**Forecasts of Vanadium prices only take into account steel market supply/demand dynamics.**

**No provision has been made for grid storage or titanium alloying demand effects.**

# Vanadium Consumption Growth

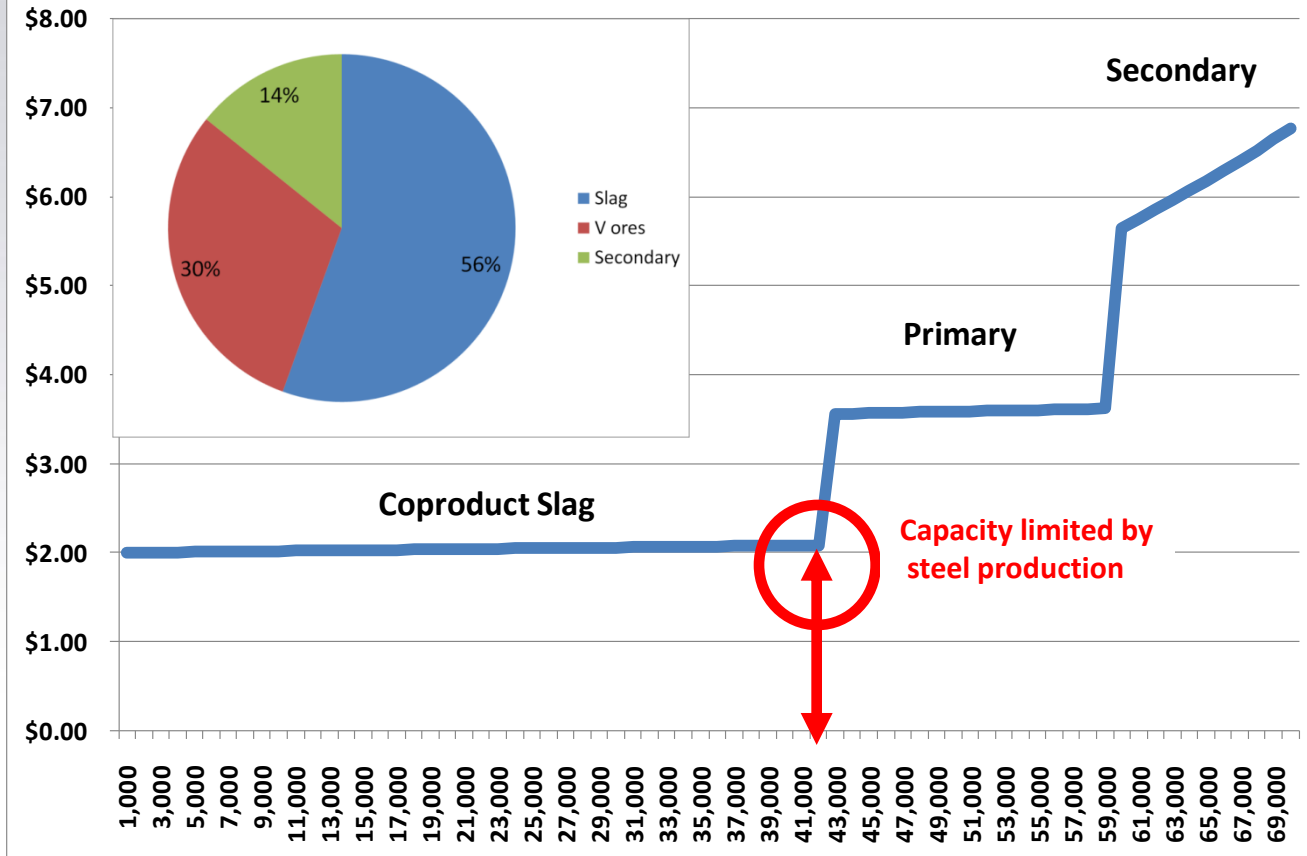
1999 – 2020 (V<sub>2</sub>O<sub>5</sub> Equivalent)



**Global Vanadium Consumption is predicted to double by 2020**



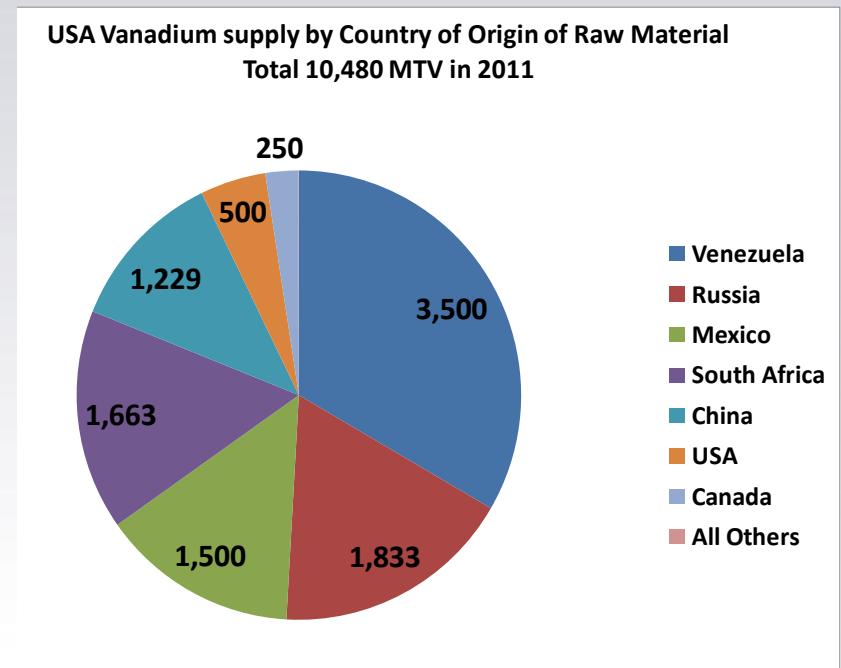
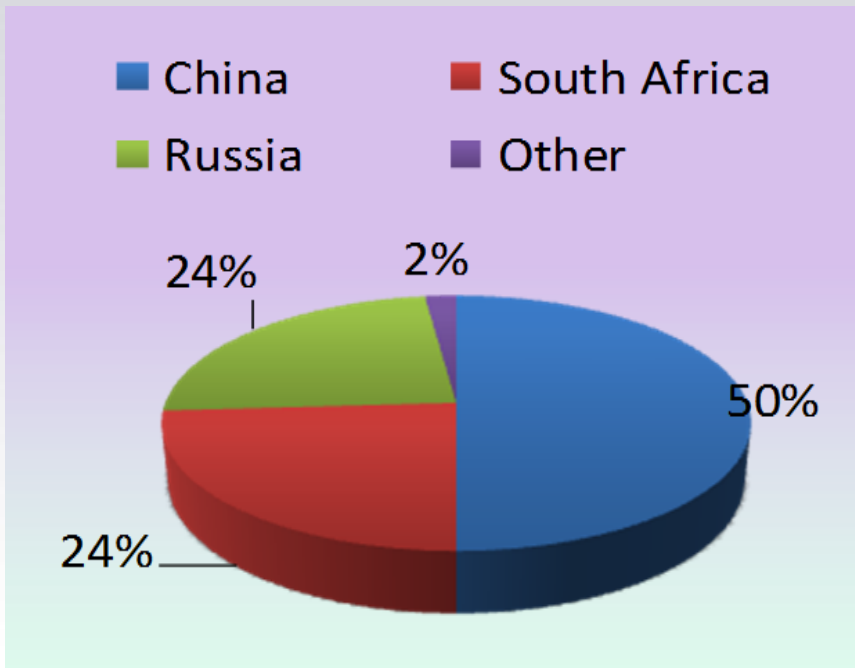
## 2010 Vanadium Industry Cost Curve







# Primary Vanadium Mining Production



**US imports:** 95% of its Vanadium for steel.  
100% of its Vanadium for titanium alloys



# Gibellini Hill Project



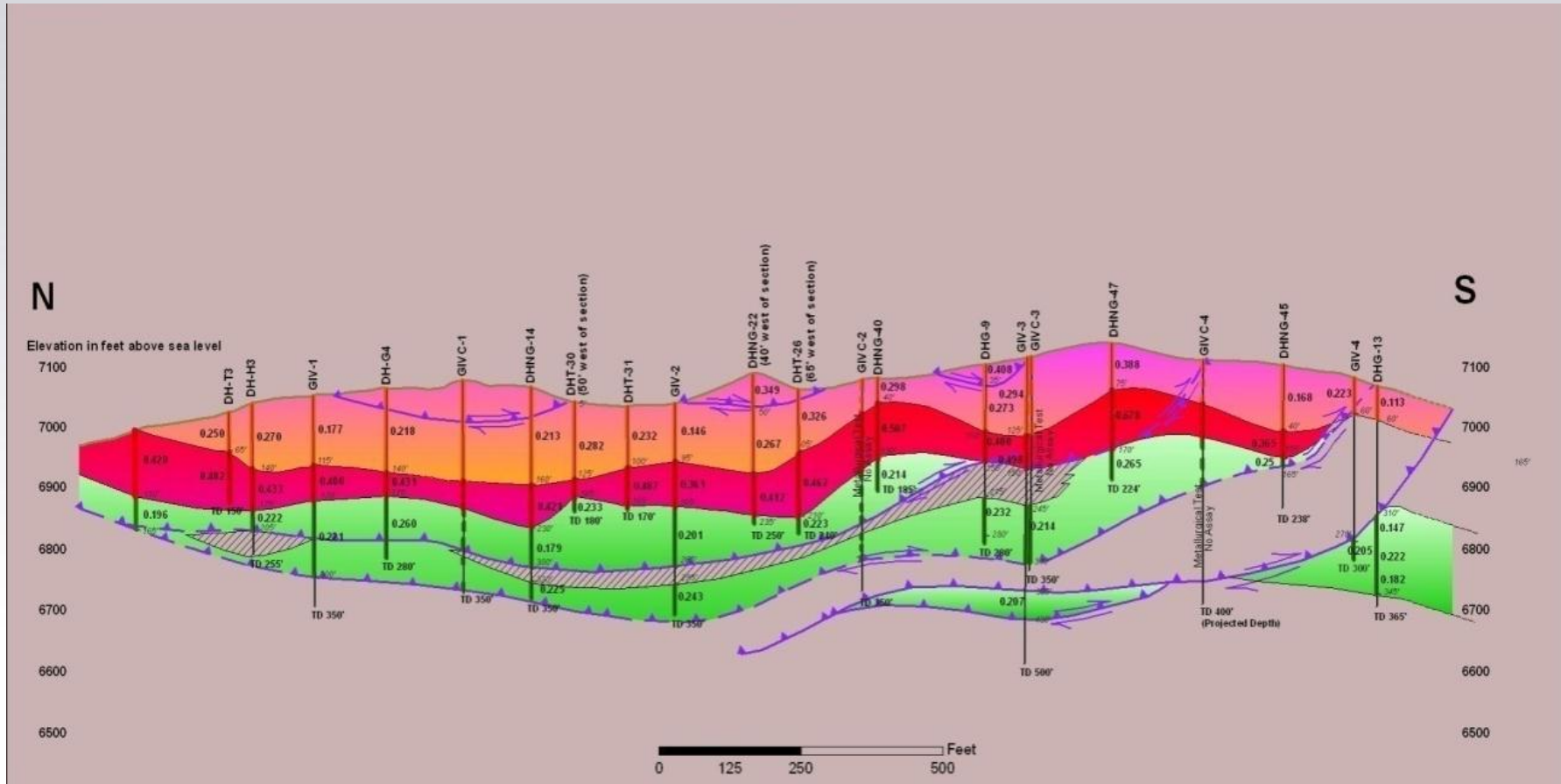
- 100% owned by American Vanadium
- 3,400 acres – 298 unpatented claims
- \$145,000 Annual Prepaid Royalty, 2.5% NSR
- Historic exploration drilling > 160 holes by Union Carbide, Noranda, Atlas
- AMEC Scoping Study in 2008
- Potentially lowest cost primary vanadium producer in the world
- Could supply 5% of world's current demand for vanadium for 15 years

## NI 43-101 Compliant Resource

Category	Tons (MM)	V <sub>2</sub> O <sub>5</sub> Grade (%)	Pounds V <sub>2</sub> O <sub>5</sub> Contained
Total Indicated	18.0	0.339	122 million
Total Inferred	2.8	0.282	16 million



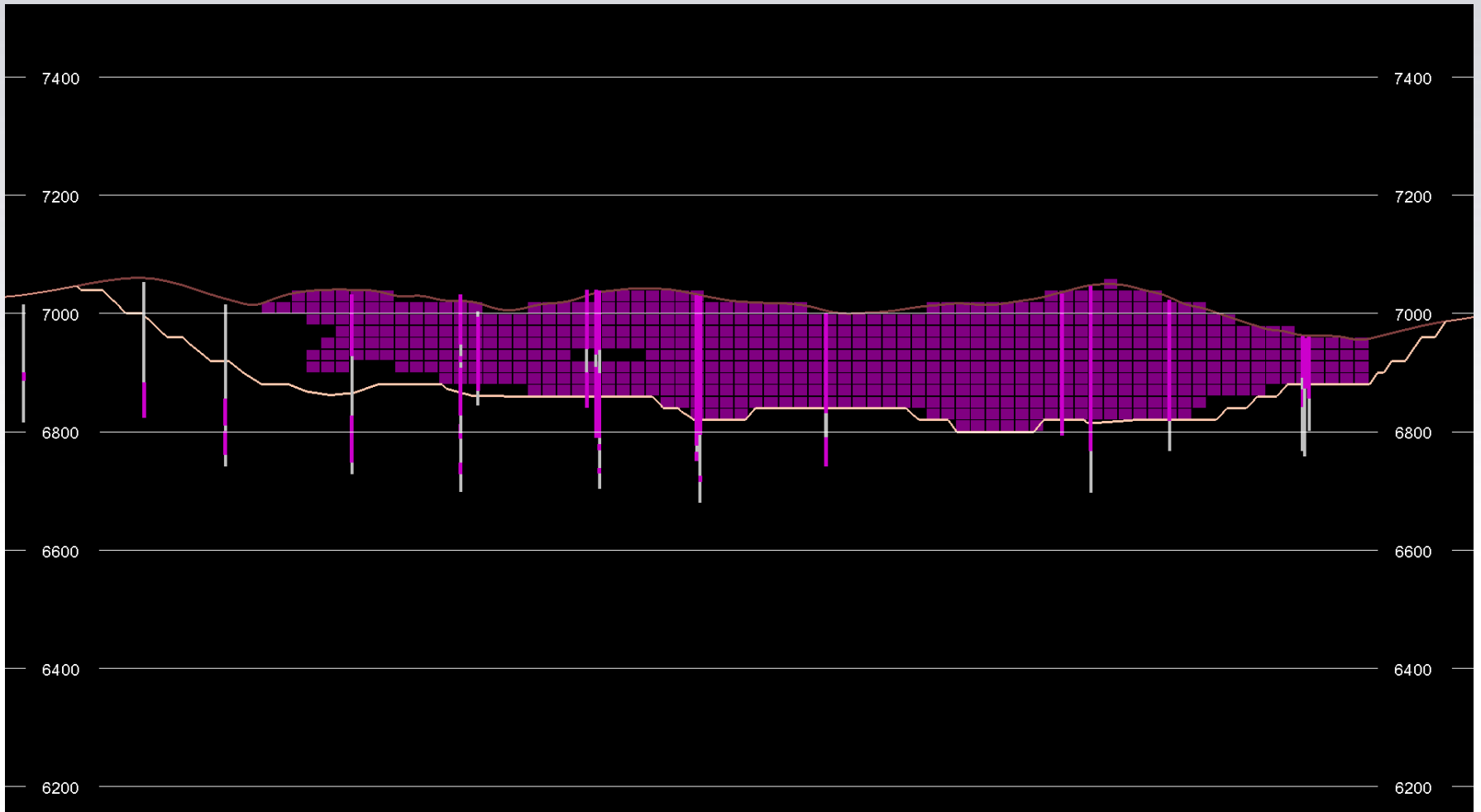
# Gibellini Hill Geology







# Gibellini Hill Long Section SW View

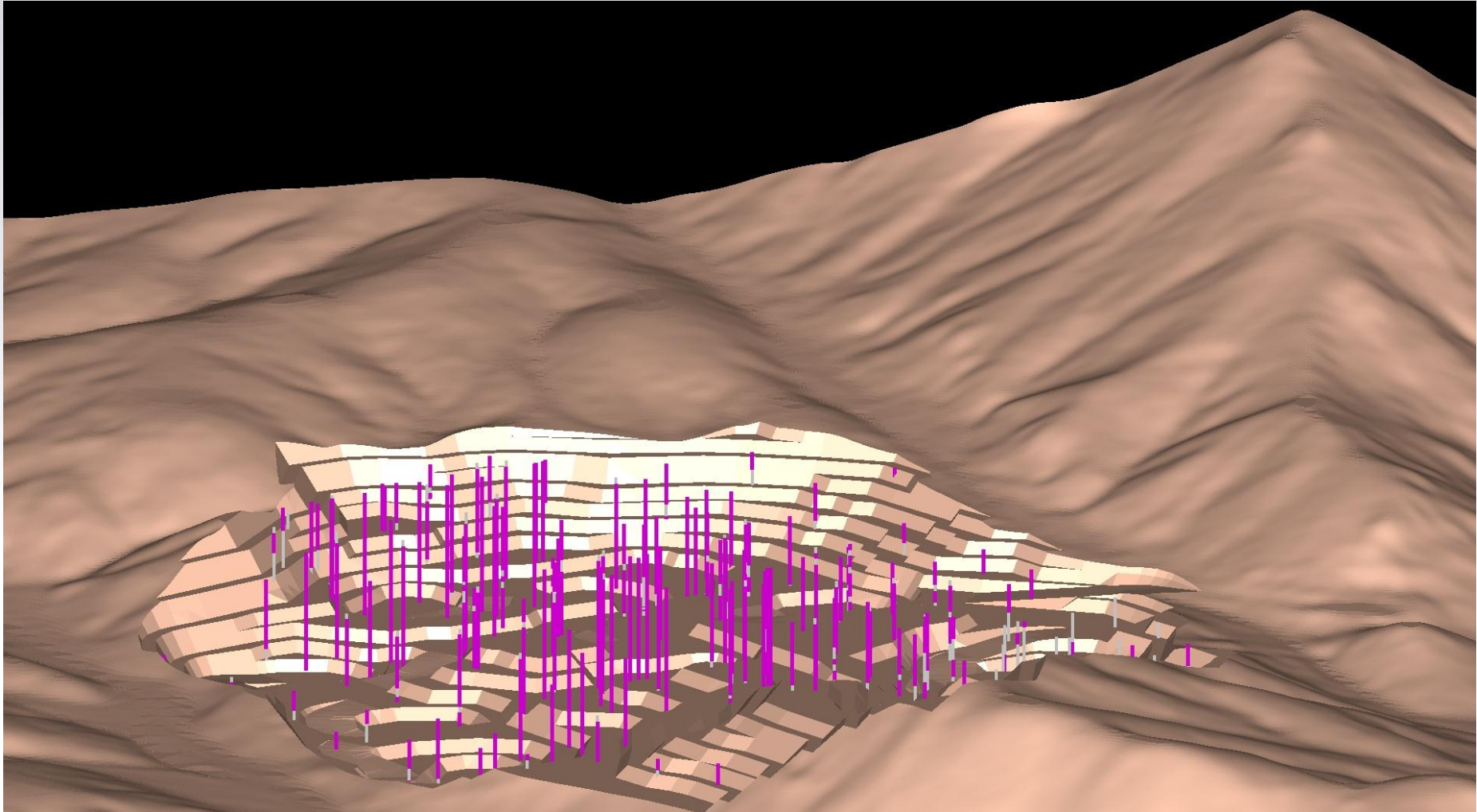




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# Gibellini Hill Final Pit w/ Drill Holes North View

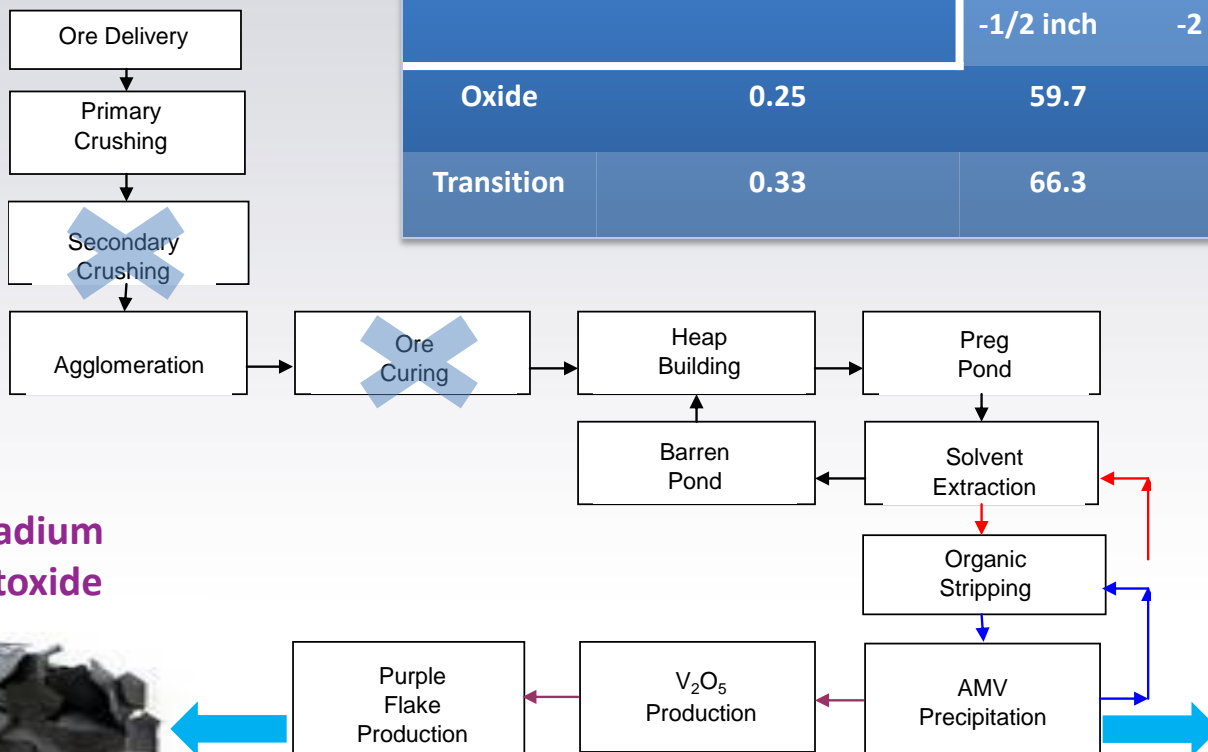




# Process Flow Sheet - Sulfuric Acid Heap Leach

Sample	Head Grade % $V_2O_5$	Recovery	
		-1/2 inch	-2 inch
Oxide	0.25	59.7	63.7
Transition	0.33	66.3	74.1

\*No longer required



Vanadium Electrolyte



No grinding, No roasting and  
Two Products made onsite





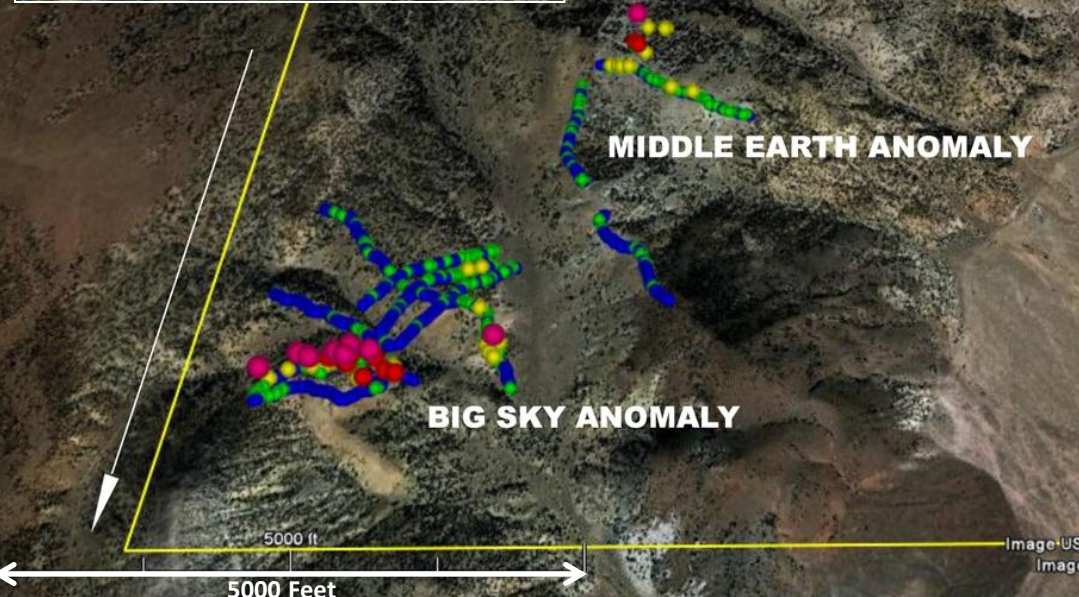
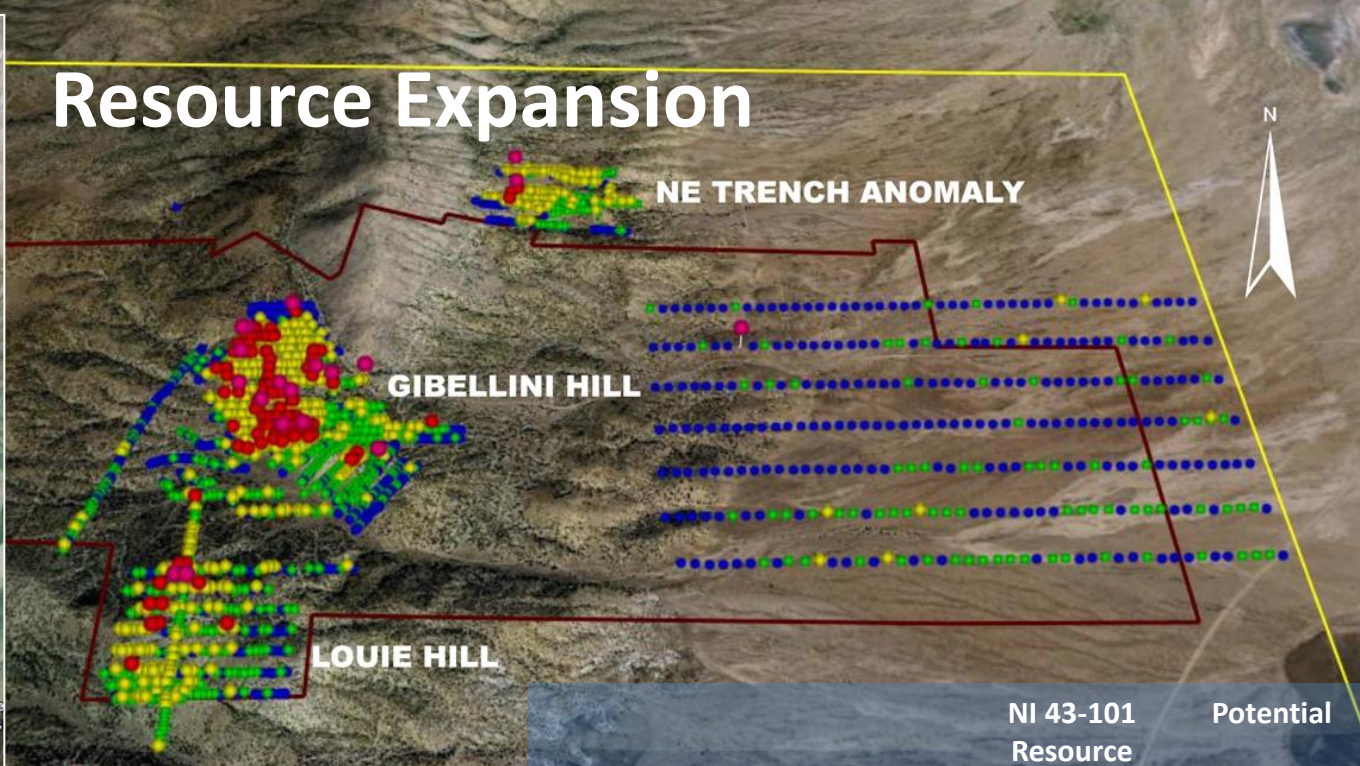
# Gibellini Hill Operating Plan



**Feasibility Study and updated NI 43-101 by AMEC expected Q3 2011**



# Resource Expansion



	NI 43-101 Resource	Potential
Gibellini Hill	21MT	
Louie Hill	10MT	
	10 MT Target	
	10 holes drilled by AVC	
	50 historic holes by Atlas	
	Similar geology to Gibellini Hill	
	Higher grade intercepts	
	Could add 50% to mine life	
Middle Earth	5 MT	
Big Sky	5 MT	
Del Rio	20 MT	

2011 Budget of \$1,000,000



# AMEC Scoping Study

<b>Annual Tonnage, short tons</b>	<b>3,000,000</b>
<b>Vanadium Production, lb V<sub>2</sub>O<sub>5</sub>/yr</b>	<b>14,000,000</b>
<b>Capital Cost</b>	<b>\$89,000,000</b>
<b>Operating Cost, /ton</b>	<b>\$14</b>
<b>Operating Cost, /lb V<sub>2</sub>O<sub>5</sub></b>	<b>\$3</b>
<b>NPV @ 5% Discount</b>	<b>\$89,000,000</b>
<b>IRR After Tax</b>	<b>40%</b>

## Scoping Study and 43-101 Technical Report by AMEC, Oct 2008

Using \$6.00 V<sub>2</sub>O<sub>5</sub> Price

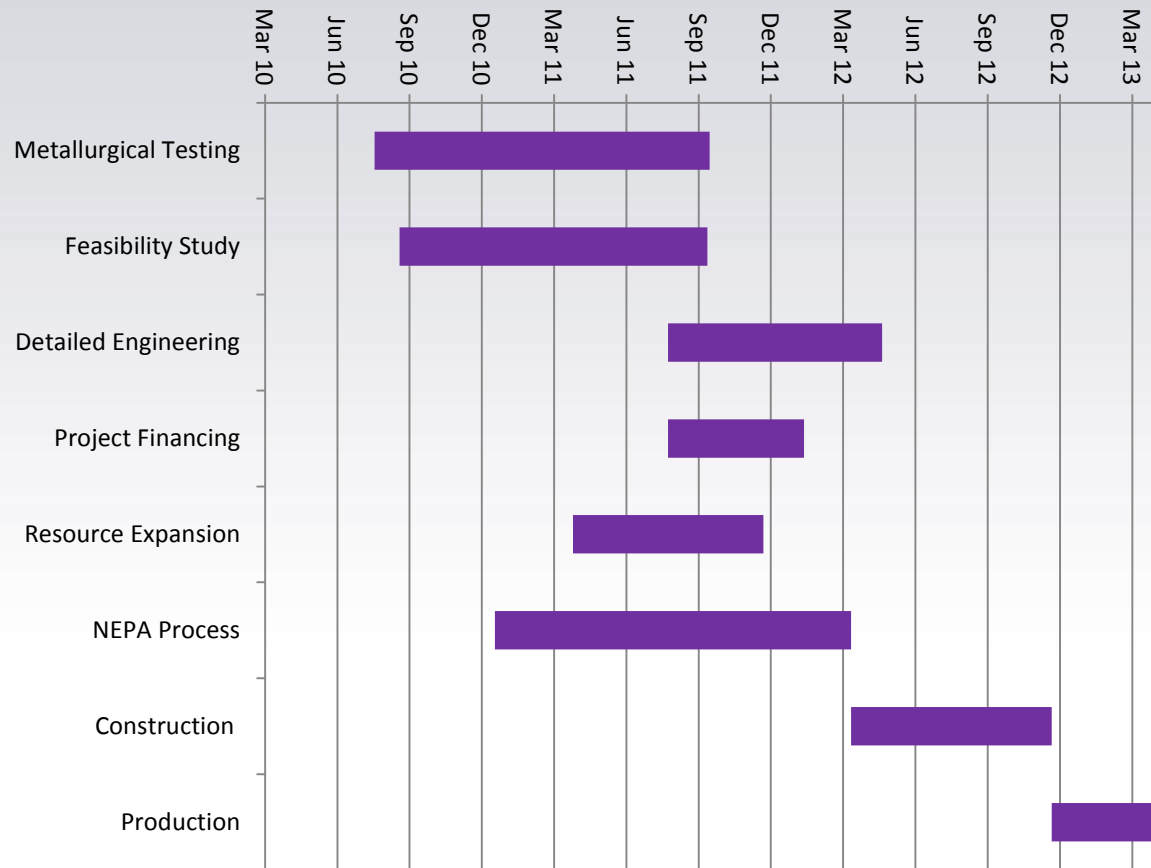
### Opportunities to improve:

- Reduce sulfuric acid consumption
- Reduce crushing
- Power, capital, operating costs





# Timeline





# Investment Advantages

## **Excellent capital structure**

## **One of the lowest cost & easiest vanadium operations in the world**

Favorable geology

Open pit with 0.2 strip ratio

Heap leach with minimal crushing

Low capital cost

## **Excellent mining jurisdiction**

## **Low risk**

## **Project expansion opportunities**

## **Vanadium**

Likely increase in Vanadium price

Strategic resource

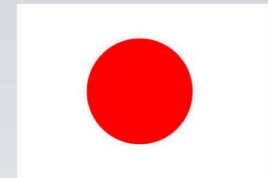
Vertical integration into electrolyte production

Vertical integration into value added alloys

## **Strategic opportunities and exits**



# Vanadium – The critical element for the US



It is critical that the USA develop and implement a plan to become more self reliant in terms of vanadium supply.





## Bill Radvak, President & CEO

Suite 1028, 550 Burrard Street  
Vancouver, BC Canada  
V6C 2B5

Tel (604) 488-5417

Cel (778) 888-4101

[TSX.V: AVC](#)

[US: RMRCF](#)

[Germany : OUA](#)

[bradvak@americanvanadium.com](mailto:bradvak@americanvanadium.com)

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