

Shocking Future Battering the Lithium Industry through 2020

Edward R Anderson

B.Sc.(Hons)., Dpl.(Marketing Research)., MBA., FCI Arb

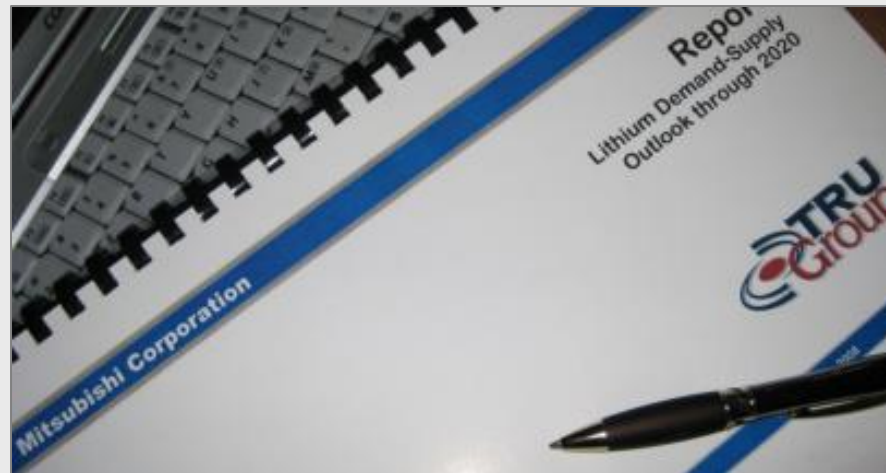
TRU Group Inc

trugroup.com

✉ anderson@trugroup.com

History of this update 2011

- ✓ Update presented at IM January 2009 Santiago
 - ✓ Periodically tracked and updated by TRU
- ✓ Major update and restructuring last month 2010



Outlook Objective

To develop a base case demand-supply forecast for the global lithium market through 2020

- lithium consumption by main end-use
- lithium sources of supply – brine & mineral
- main determinants of demand and supply
- establish demand-supply balance and impacts

- main purpose is supply-demand balance through 2020.

TRU Approach

Strong Qualified Team

- Brine, Mineral Mining, Extraction and Processing
- Basic & Intermediate lithium Chemicals Engineering Processing
 - Lithium End-using Industry Experts
- Modeling, Technology Forecasting, Market Research, Cost Analysts

Clear Proven Track Record

- Several multi-billion-dollar, High Tech Li-Chemical and Lithium Juniors as Clients
- Numerous Engineering, Feasibility Studies and Due Diligence Completed

Professional • Independent • Bankable

2009 Santiago Forecast Correct ✓

- Sustainability on Supply Side
- Sustainability on the Demand Side

Mapped Industry Structure



Lithium Carbonate



Batteries
 Air Conditioning
 Polymers
 Glazing Ceramics
 Aluminum Process
 Other Li Carbonates

- Li Phosphate
- Li Nitrate
- Li Carbonate

➤ Lubricants



- Primary Batteries
- Aluminum Alloys



Lithium Hydroxide

Low Na Lithium Chloride

High Na Lithium Chloride



Polymers
 Pharmaceuticals
 Chemicals

Other High Na Li Chlorides >

Glass Ceramics



Model Update 2011

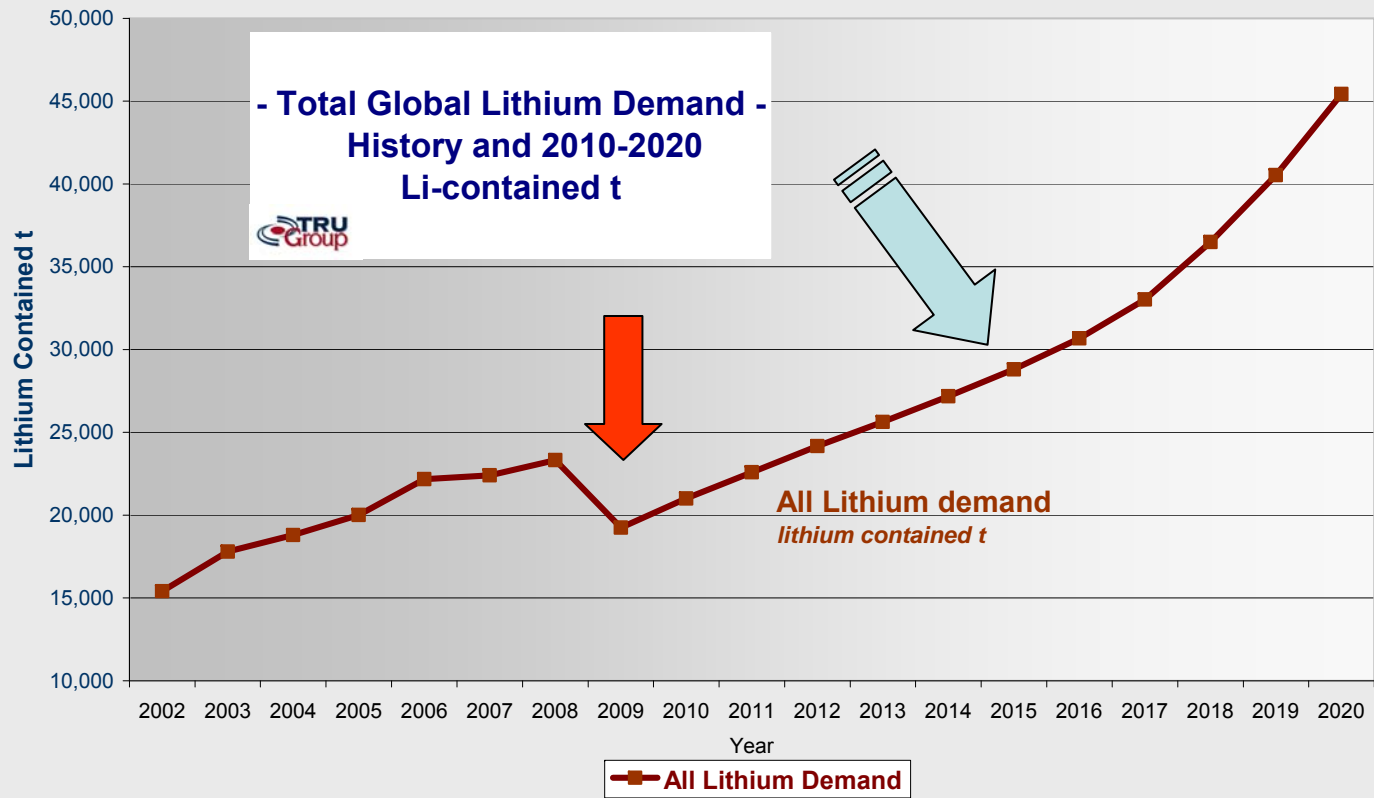
□ Demand Side

- Recession 2009-10 deeper and more global
 - Recession recovery only in 2011

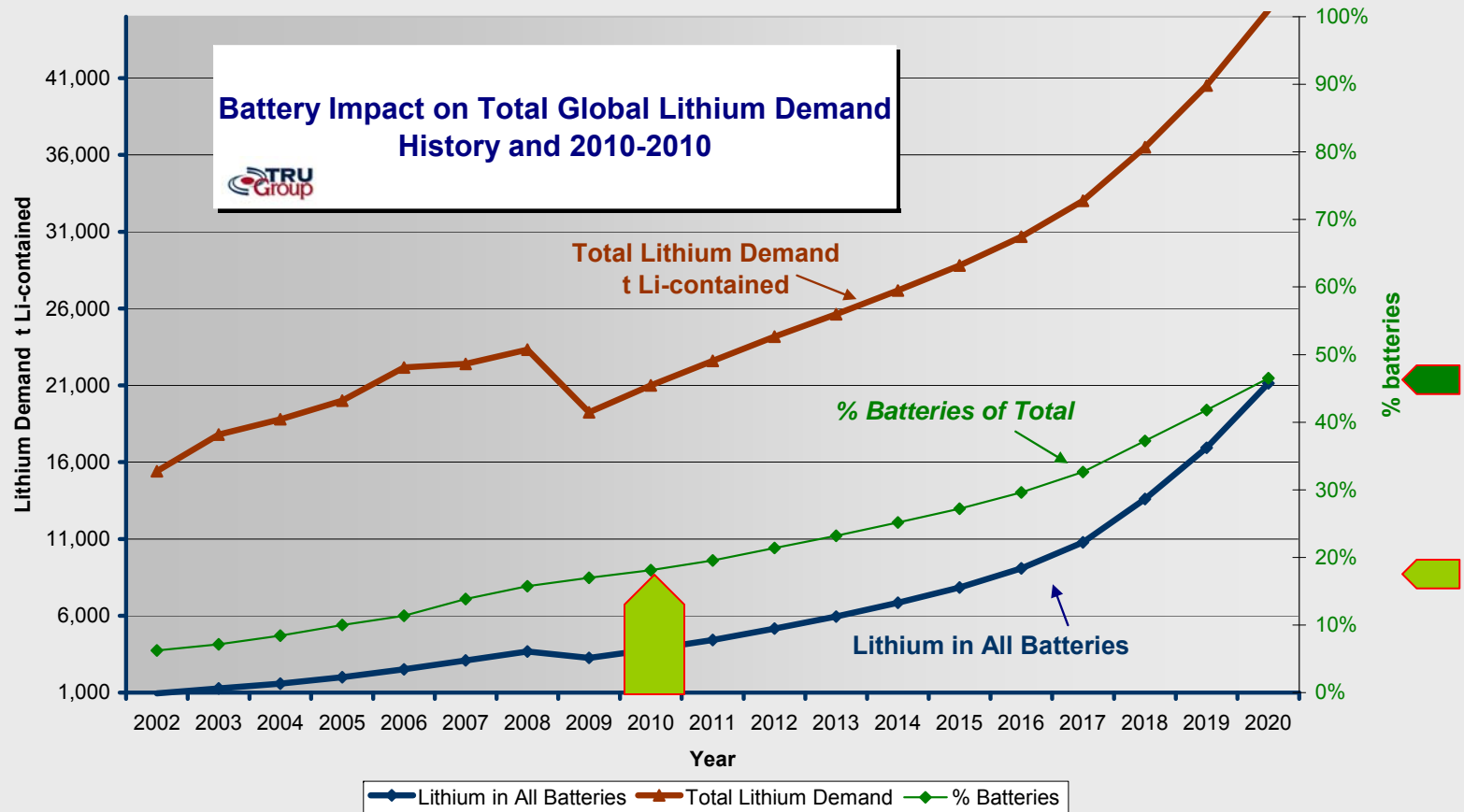
□ Supply Side

- New lithium projects proceeding *whatever?*
- Probability of project cancelations, delay and *(technical + business)* failures!

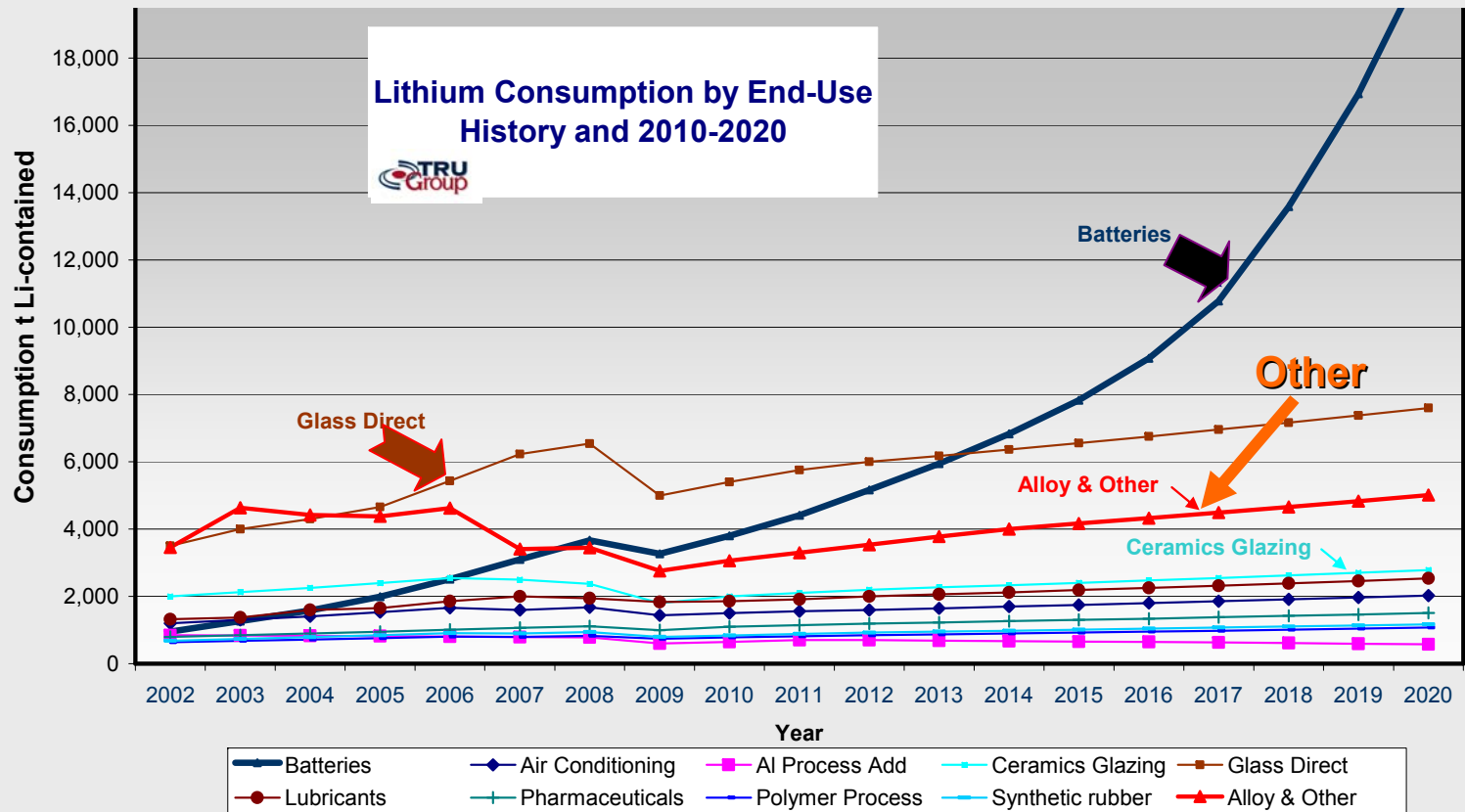
Demand Curve



Batteries Impact High



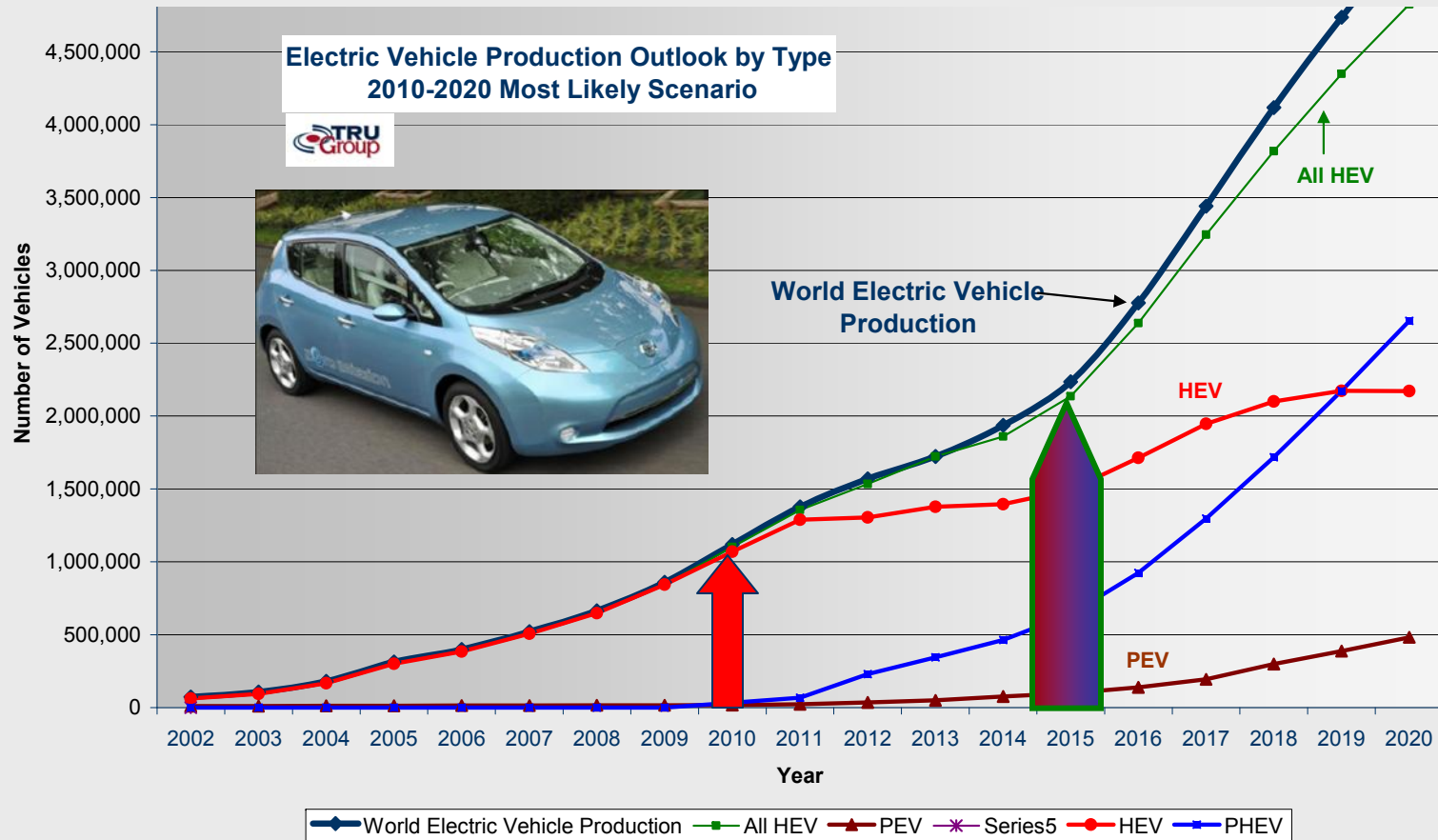
User Segment Patterns



Battery Use of Lithium by Type

Battery Type t Li-contained	2005	2010	2020	% Growth pa	
	% total	% total	% total	05-10	10-20
Primary Batteries	26%	19%	8%	7%	9%
Secondary Batteries	74%	79%	49%	15%	13%
EV Batteries	0%	2%	43%	316%	64%
ALL BATTERIES	100%	100%	100%	14%	14%

Electric Vehicle Production Outlook by Type



Electric Vehicle Li-Battery Development Fundamentals

Electric Vehicle Type

Year Technical Issues
Resolved for Lithium Battery

Hybrid Electric Vehicle

2011

Plug-in Hybrid Electric Vehicle

2014

Plug-in Electric Vehicle

2015

Fuel Cell Vehicles

2018



User Segment Overview

USE SEGMENT - t Li-contained	2005	2010	2020	% Growth pa	
	% total	% total	% total	05 - 10	10 - 20
Air Conditioning	8%	7%	4%	-0.4%	3.1%
Aluminium Process Add	4%	3%	1%	-4.5%	-1.2%
Batteries	10%	18%	47%	13.8%	18.7%
Ceramics Glazing	12%	10%	6%	-3.5%	3.4%
Glass/Ceramic Li Add	23%	26%	17%	3.0%	3.5%
Lubricants	8%	9%	6%	2.4%	3.1%
Pharmaceuticals	5%	5%	3%	2.9%	3.2%
Polymer Process	4%	4%	2%	0.7%	3.2%
Synthetic rubber	4%	4%	3%	-0.2%	3.4%
Other Plus Alloy	22%	15%	11%	-6.9%	5.1%
ALL USES Li-contained	100%	100%	100%	1.0%	8.0%
<i>Chemical Uses Demand</i>	77%	74%	83%	0.3%	9.3%
<i>Glass/Ceramics Direct</i>	23%	26%	17%	3.0%	3.5%



Supply Classes

Level I: Supply from Existing Plants

Level II: Pipeline Projects Supply 2010-2015

Level III: New Developments Supply 2015-2020

Notable Supply Drivers

- i. Existing low-cost (brine-based) plants can expand significantly**

- ii. Emerging technologies provide new options for medium-scale lithium developments ***

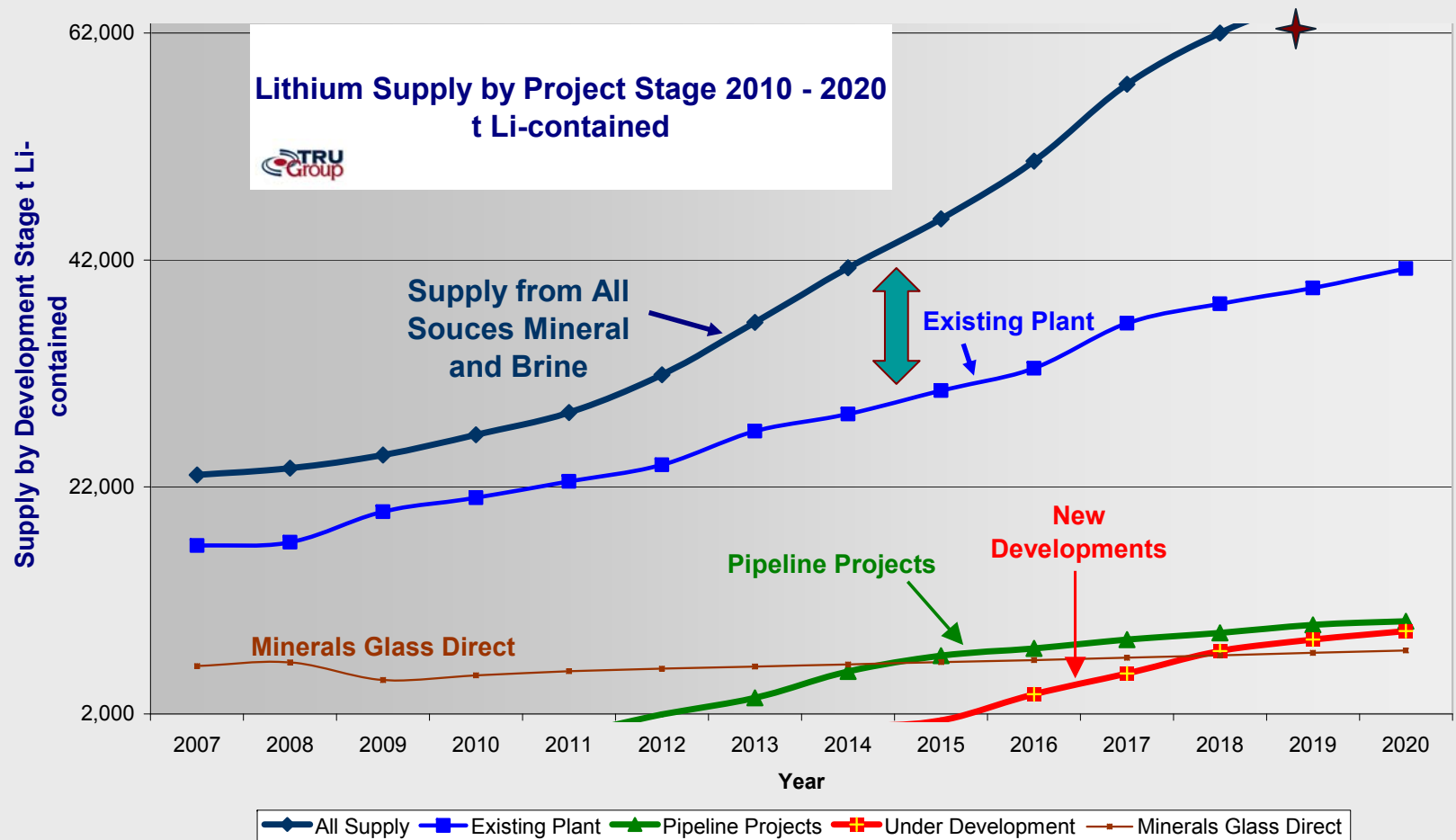
- iii. Mineral-based supply (for basic Li chemicals) could be a back-up for supply with price escalation**

** selective ion adsorption, electrodialysis, nanofiltration, etc*

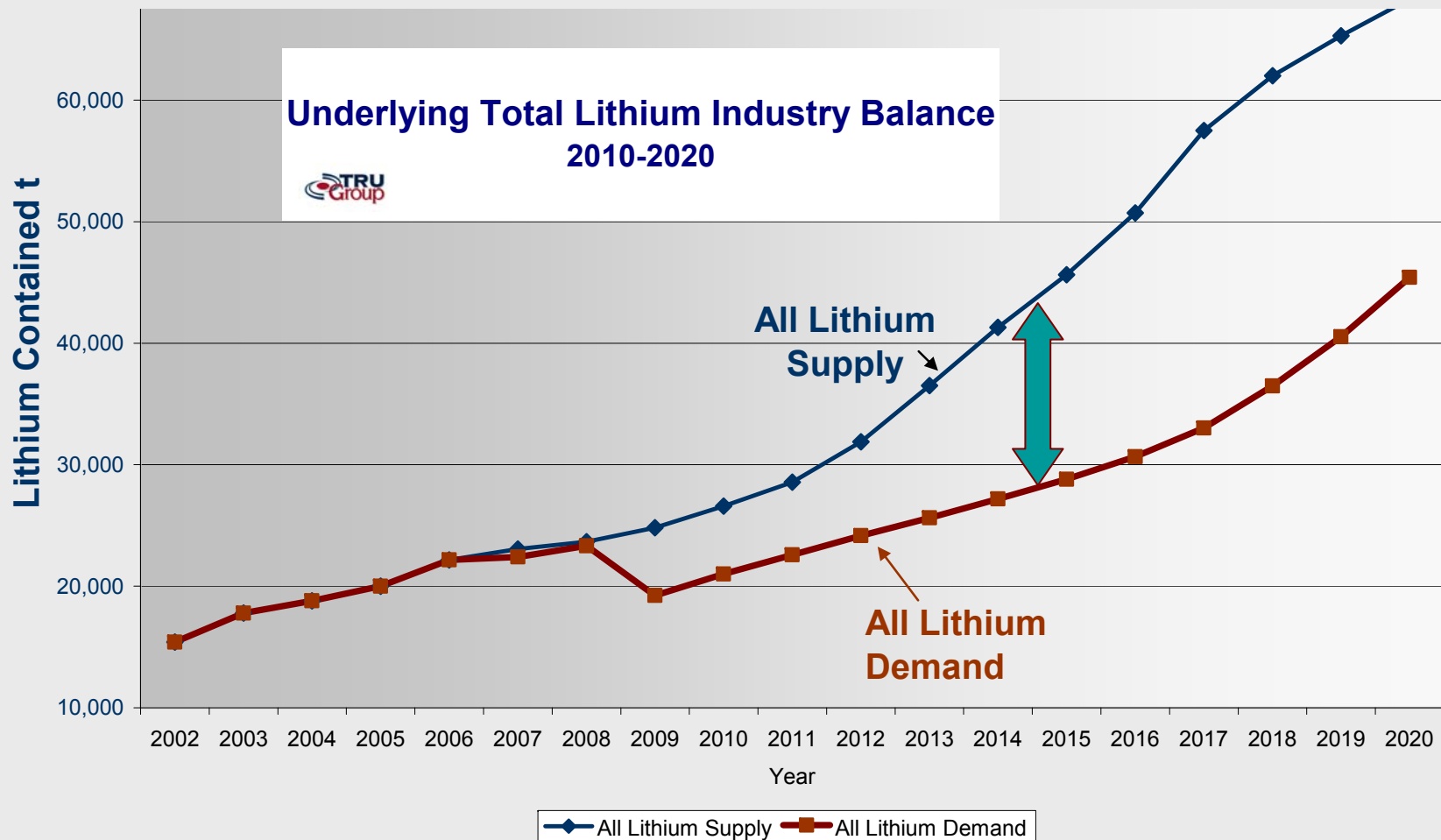
Supply All Li Grades by Stage

Supply Stage t Li-contained	2010	2015	2020	Average % Grow	
	% total	% total	% total	10-15	15-20
Existing Plants	79%	67%	60%	7.7%	6.2%
Pipeline Plants	0%	16%	15%	122.3%	7.3%
New Developments	0%	3%	14%	-	-
Glass Use Direct	20%	14%	11%	4.0%	3.0%
Total Lithium Supply	100%	100%	100%	11.4%	8.4%

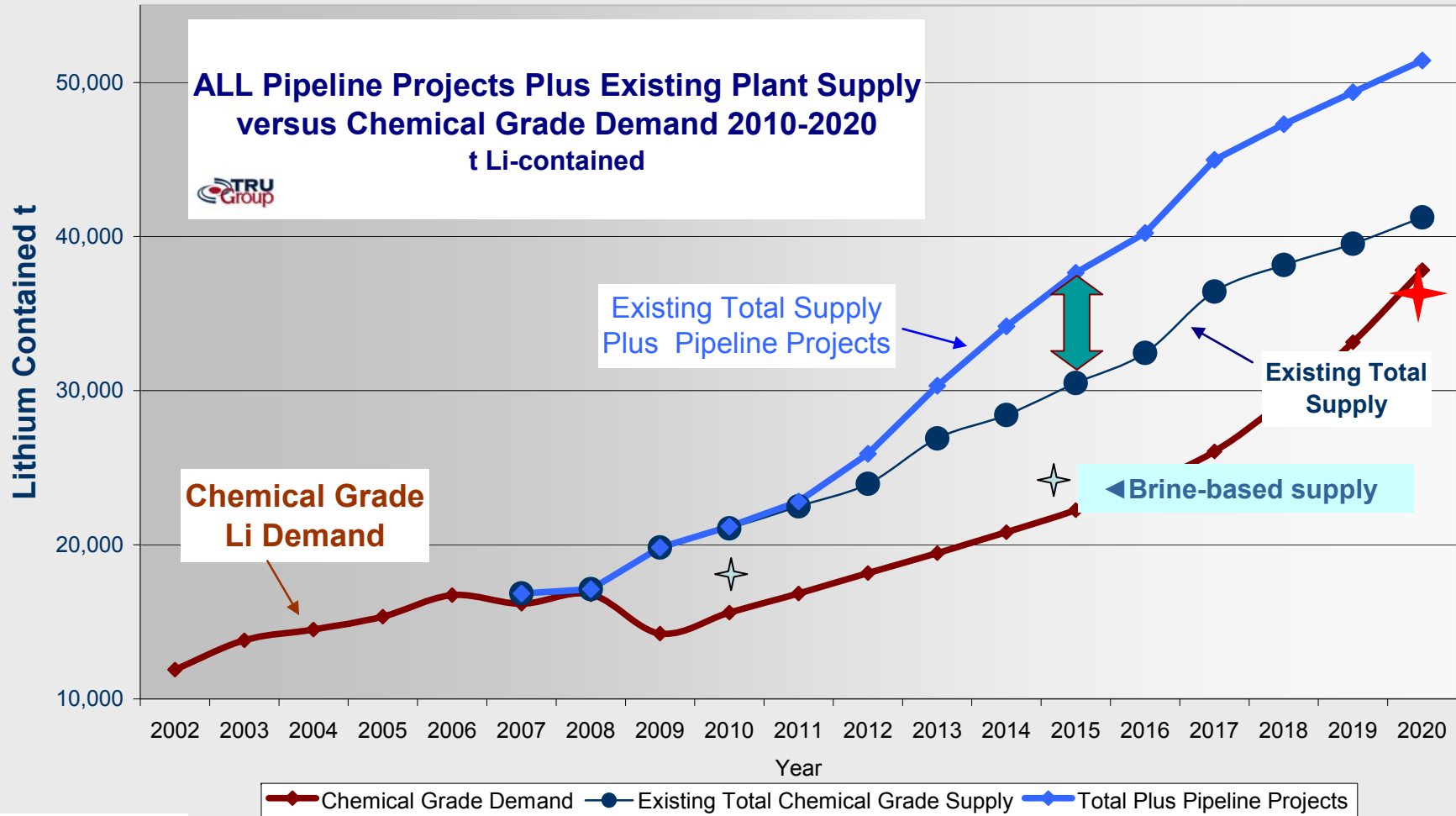
All Grades Supply Pattern



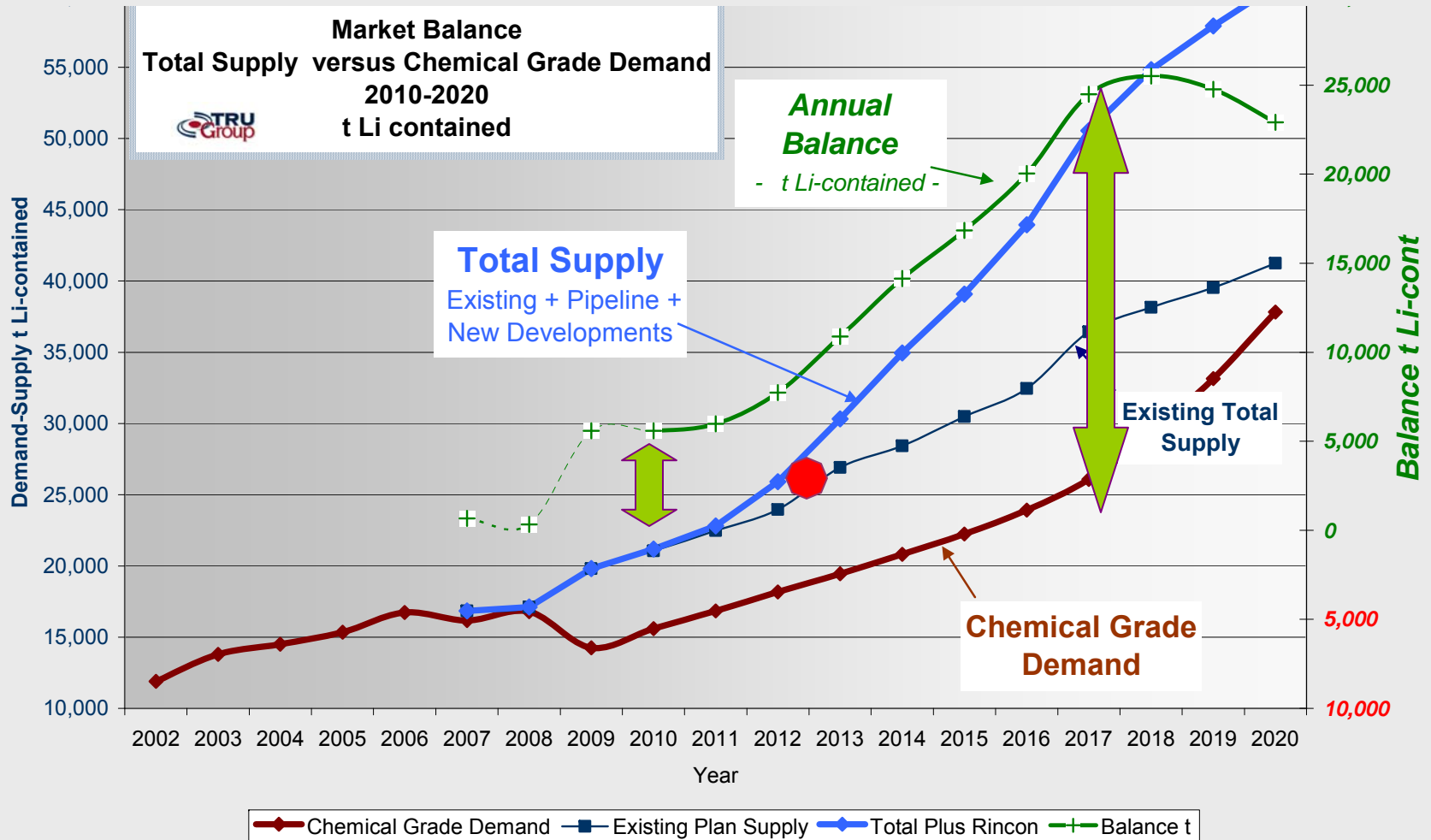
All Lithium Supply-Demand



Chemical Grade Lithium Supply Band vs. Demand



Chemical Grades Lithium Market Balance

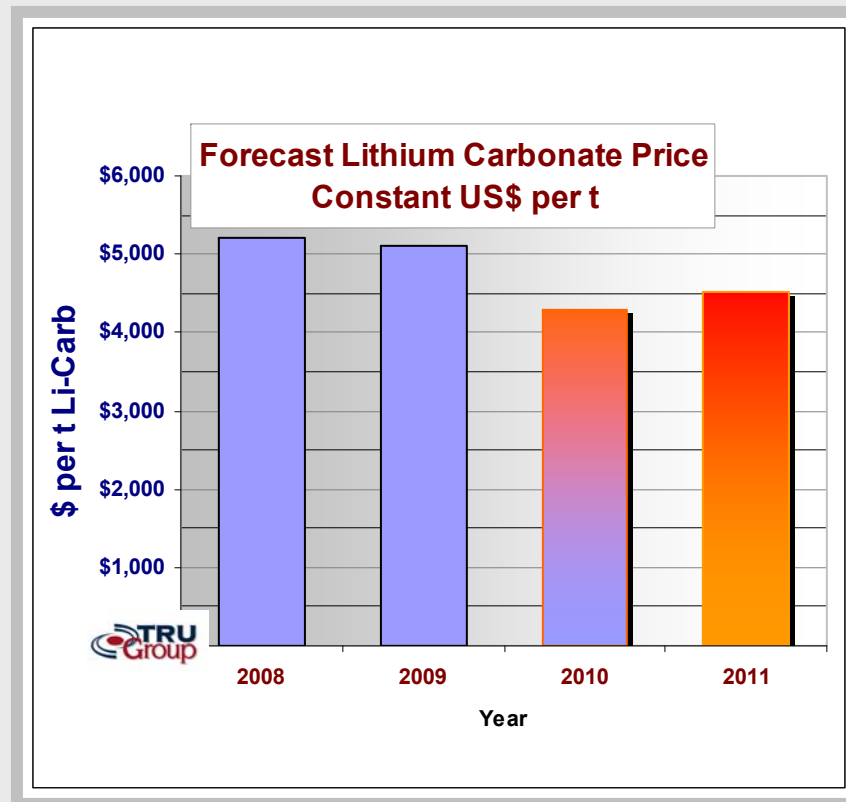


How & Why Shocking?

- **Massive lithium oversupply through 2020**
 - **Very few projects survive of sixty plus**
- **Exploitation and misuse of 43-101 reporting**
 - **“Qualified Persons” who are far from it!**
 - **Lithium chemical engineers who are not**
 - **Investors will predictably lose millions**
 - **Stock market regulators asleep**

Lithium Price Outlook 2020

Model Suggests: “Stable Prices Scenario”



Summary Outlook 2020

**Global Recession has pushed industry
into over-supply through 2009-2013**

**Pipeline Projects increase supply-demand gap
2013-2015**

**New Development Projects exacerbate
oversupply situation 2015-2020**

2017-2018

Serious Peak Oversupply

Even Existing Producers Negatively affected



technology + engineering + managing + planning + integrating

Professional • Independent • Bankable

Thank You !

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B.Sc.(Hons)., Dpl.(Marketing Research)., MBA., FCI Arb
President & CEO

TRU Group Inc

trugroup.com

✉ anderson@trugroup.com

Tucson 1-520-575-0674
Toronto 1-416-935-1754
Cell 1-520-229-7836

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