

GEOC589, GEOL589, ME589,
ME589D Advanced Topics—
Geology and Economics of
Industrial Minerals (3 credits)—
WHAT A GEOLOGIST NEEDS
TO KNOW ABOUT MARKETING
INDUSTRIAL MINERALS

Spring 2023

SAFETY

- Janin
- Devlon

Paper

- Mark
- Charlie

April we will have field trips (as I can schedule them
and weather permitting)

Will require 2 field trip reports

April 14 Fri Humate mine (clay, clinker)

April 22 Sat—Gallinas Mountains

NMGS spring meeting Fri April 21
short summary of 1 talk

MARKETING

Without a market, an industrial mineral deposit is simply a geological curiosity

FACTOR	METAL	IM
Market type	Undifferentiated	Differentiated
Total value	Lower ~33%	Higher ~67%
Specifications	Few	Many
Buyer loyalty	Low (price)	High (perform)
Branding	Uncommon	Common
Marketing	Low	High

MARKETING *versus* SALES

Strategic

Long Range

Customer (Long Term)

Tactical

Focused

Customer (Daily)

versus

|← *Overlap*

→|

Marketing is the
exploration phase for
industrial minerals and
rocks

IM SEGMENTS	PERCEIVED IMPORTANCE	PRACTICAL IMPORTANCE
<i>Marketing</i>	5	1
<i>Transport</i>	4	2
<i>Processing</i>	3	4
<i>Mining</i>	2	5
<i>Exploration</i>	1	3

Geology dictates deposit
existence

Markets dictate deposit development

Transportation

IM MARKET TYPES

Commodity = Product driven

Specialty = Market driven

GENERAL IM TYPE

	COMMODITY	SPECIALTY
MARKETING NEEDED	↓	↑
TECHNICAL SUPPORT	↓	↑
RESEARCH & DEVELOPMENT	↓	↑

COMMODITY *vs* SPECIALTY EMPHASIS

Specialty Alone high value high risk

Commodity Alone low value mod. risk

Commodity + Specialty moderate value least risk

MARKET CHARACTERISTICS	COMMODITY MINERALS	SPECIALTY MINERALS
Place Value	High (transport sensitive)	Low (transport insensitive)
Volume	Large	Small
Unit Price	Low	High
Substitution	Easy	Hard
Differentiation	Less	More

MARKET CHARACTERISTICS	COMMODITY MINERALS	SPECIALTY MINERALS
Specifications	Standard	Customized
Sample evaluation	Short	Long
Properties, uniformity	General	Controlled
Testing	Standard	Customized

MARKET CHARACTERISTICS	COMMODITY MINERALS	SPECIALTY MINERALS
Market & Management style	Business	Technical
Main sales basis	Price (undifferentiated)	Performance (differentiated)
Time to first sale	Short	Medium to Long
Market change	Slow to moderate	Rapid to moderate
Lab & R&D need	Low	High

MARKETING

Market Study = What?

Market Development = Where?
How?

MARKET STUDY

Commodity Survey — basic data, easy,
past & present

Market Evaluation— forecasting, hard,
future

MARKETING STUDY

*Asking the right questions of the
right people!*

Mineral to end use market

Mineral



Intermediate product



Intermediate market



End use market

ilmenite



titanium dioxide white pigment



white paint manufacturer



automobiles/DIY

Mineral to end use market

bentonite clay



talc



Mineral to end use market

silica sand



zeolites



emery



diatomite



Commodity Survey

- Existing Data
 - Financial
 - Production
 - Geological
 - Legal
 - Environmental
- Very minor forecasting

MARKET EVALUATION

- Forecasting (volume, price)
- Economic/Financial Analysis
- Specific Products
- Timing
- Location

APPROACH

Industrial (Short time)

Consumer (Long time)

**MARKETING
ORGANIZATION
TYPES**

In-house
Distributors
Agents
Merchants
Traders

MARKET POSITIONING STRATEGIES

- Low cost
- Differentiation
- Focus
- Segmentation

Mine to market supply chain

SUPPLY



SUPPLY

LOGISTICS

MARKET

- exploration
- mineral finance
- plant engineering
- mining
- processing
- trading
- port handling
- mineral inspection
- freight
- warehousing/distribution
- direct market mineral consumer
- intermediate market mineral consumer
- end market mineral consumer



DEMAND

Major Markets

- Agriculture
- Ceramics
- Chemical
- Glass
- Paints
- Paper
- Plastics
- Refractories
- New markets

baddaleyite

ball clay

borates

celestite

feldspar

fluorspar

halloysite

kaolin

limestone

lithium minerals

nepheline syenite

petalite

plastic clay

quartz

rare earths

silica sand

soda ash

spodumene

talc

wollastonite

zircon

Ceramics

Chemicals

borates

celestite

chromite

fluorspar

iodine

limestone

lithium

magnesia

manganese

nitrates

phosphates

pyrites

rare earths

salt

soda ash

sodium sulphate

sulphur

zirconia

Glass

borates

dolomite

dolime

feldspar

fluorspar

kaolin

lime

limestone

lithium carbonate zircon

lithium minerals

nepheline syenite

petalite

quartz

rare earths

silica sand

soda ash

sodium sulphate

spodumene

Paint, Paper, Plastics

alumina trihydrate

barytes

bentonite

brucite

celestite

chromite

diatomite

feldspar

ground calcium

carbonate

gypsum

huntite-

hydromagnesite

ilmenite

iron oxide

kaolin

manganese

mica

ppt calcium

carbonate

quartz

rutile

silica sand

talc

wollastonite

Refractories

andalusite

bauxite

fused alumina

alumina

chromite

dolomite

graphite

kyanite

fused magnesia

dead burned magnesia

sintered mullite

fused mullite

olivine

pyrophyllite

refractory clays

silica sand

fused silica

silicon carbide

sillimanite

sintered spinel

fused spinel

zircon

fused zirconia

New Markets

- Fuel cells, wind turbines, solar panels
- Nanomaterials
 - Particle size 1 to 100 nanometers (10^{-9} meters)
 - Clays, talc, titanium oxide, calcium carbonate
 - Chemical, mechanical, physical properties superior to larger particles—fine crystal size and large surface area
 - wood preservation, marine antifouling, thermoplastics, permanent coatings, environmental catalysts, deodorants, oral care, glass polishing, semiconductor polishing

TECHNICAL	MARKET	COMMERCIAL	DEVELOPMENT
Resources Exploration Characterisation Domaining	Studies Desktop Sectors Indicative Specs	Scoping Study inputs Value in Use Financial model	Approvals Government Community Environmental
GeoMet Metallurgy tests Product Specs Bulk Samples	Research Customer visits Price drivers Application Trial	Pre-Feas. Revised inputs Value in Use Revised \$ model	Production Construction Commissioning Stage 1 + QA/QC
Production Mining Processing Optimised + QC	Customers Relationships Key targets Trial parcels	FS / BFS Final inputs Value in Use Base \$ Model	Expand Stage 2 Marketing & Sales
Logistics Options Contracts Integration	Strategy NDA, LOI/MoU Market Entry Risk Analysis	\$ Funding Debt / Equity Offtake Contracts	Replacement or Closure

Table 2: "VALUE IN USE" – Industrial Minerals Project and Business Evaluation Matrix

Industrial Minerals – Evaluation and Profitability (tandfonline.com)

SUMMARY

Metals and IM's require markedly different approaches

Marketing dominates industrial minerals

IM marketing style = industrial, not consumer

Marketing (strategic) and sales (tactical) differ

IM marketing evaluation = Ask the right questions

IM markets = commodity (product) or specialty
(market)

IM Marketing Summary Table

Market Characteristics	Commodity Minerals	Specialty Minerals
Place value	High (transport sensitive)	Low (transport insensitive)
Volume	Large	Small
Unit price	Low	High
Substitution	Easy	Hard
Differentiation	Less	More
Specifications	Industry standard	End-user customized
Sample evaluation	Short	Long
Properties & uniformity	General	Highly controlled
Testing	Standard	Specific or customized
Marketing & management style	Business	Technical
Main sales basis	Price (undifferentiated)	Performance (differentiated)
Time to first sale	Short	Medium to long
Rate of market change	Slow to moderate	Rapid to moderate
Need for laboratories and R&D	Low	High

- **Mineral consuming market existence & its performance directly affects demand for mineral raw materials, ie. industrial minerals**
- **no market demand = no mineral supply
= no mineral development**

Field trip Friday April 14

- Meet West Bureau parking lot 7:30 AM
- How many are going
- Van=Jakob
- Truck=Devlon
- Read Newcomer et al. 2021
https://nmgs.nmt.edu/publications/guidebooks/downloads/71/71_p0153_p0158.pdf
- Read chapter on marketing in IM book
- Collect samples
- 2 field trip reports required

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