



U.S. Geological Survey – National Minerals Information Center: An Overview

**2024 National Slag Association Annual Meeting
16 September 2024**

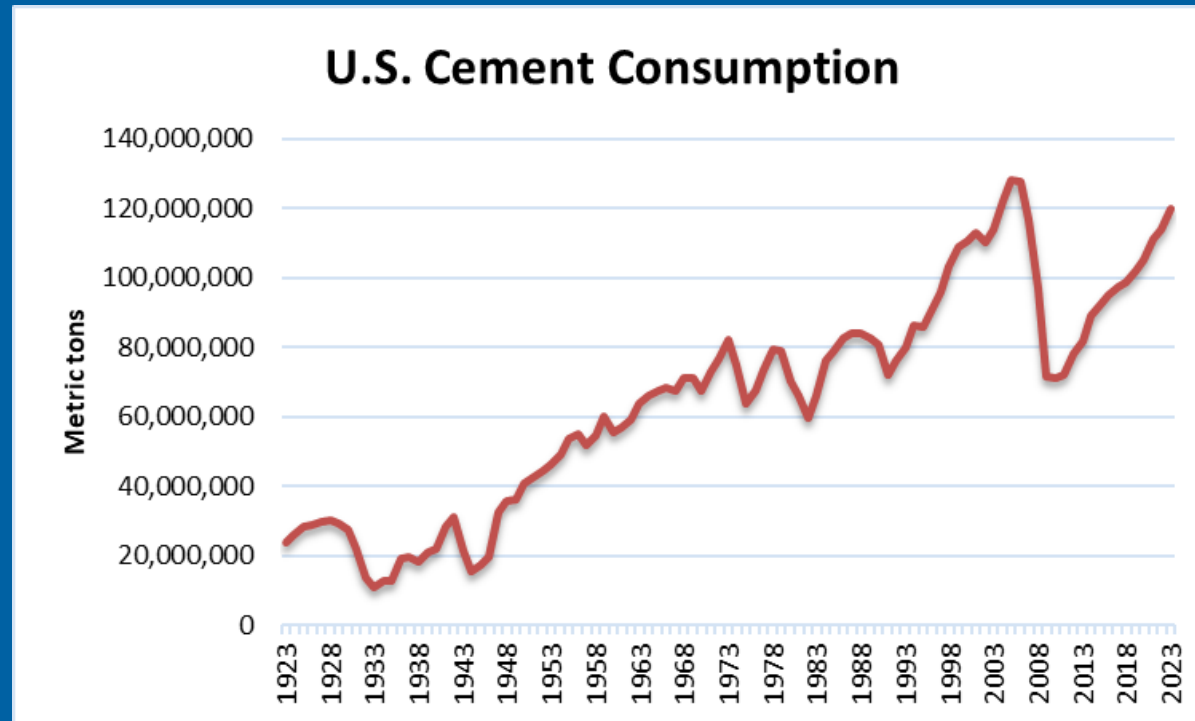
**Elizabeth Sangine
Chief, Mineral Commodities Section, National Minerals Information Center
U.S. Geological Survey**

Importance of Mineral Resources Information

- Using most of the periodic table
- Annual consumption at unprecedented levels
- Global population / growth of the “middle class”
- U.S domestic production vs import reliance
- Life cycle analysis and end of life or byproduct use/recovery/loss
- Long lead time for development of new resources

Demand for Mineral Commodities

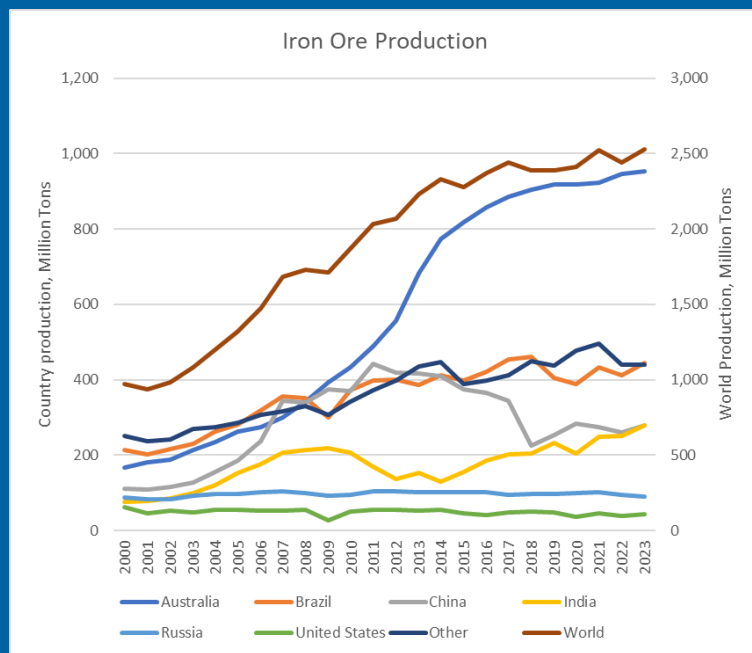
- Growing Rapidly
- Continued Demand Growth Anticipated for ROW



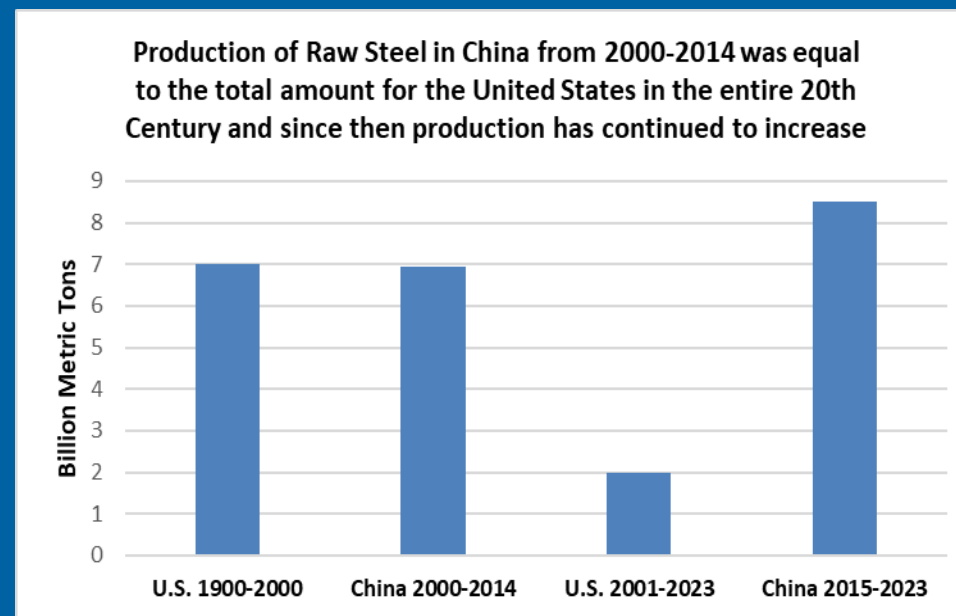
Global Demand for Mineral Commodities

- Historically Unprecedented
- Dominated by Development in China

Iron Ore

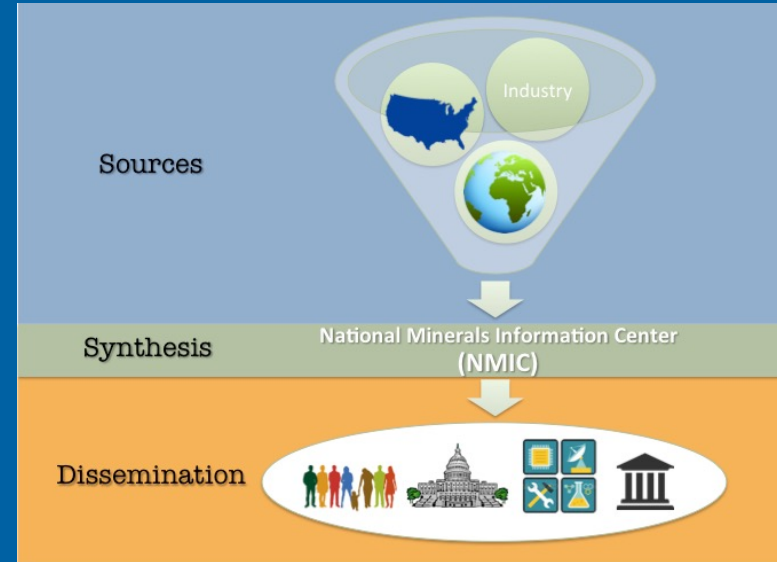


Steel



Who we are: National Minerals Information Center – Business Model

- Well defined mission-
Collect, analyze, and disseminate information on the domestic and international supply of and demand for non-fuel minerals and materials essential to the U.S. economy and national security.
- Operational focus
Production shop, monthly, quarterly, and annual cycles-
Unbiased source of data and report highest quality data.



Impact of Minerals Data

- **As a player in the world market, the U.S. must know and understand worldwide markets to remain competitive and establish rational policies.**
 - **Better understand mineral resource uses, sources of minerals, the ultimate disposition of materials in the economy, and associated impacts of disposition; and**
 - **Develop public and private sector policies and practices that better use material resources.**
 - **Use information to manage risks whether naturally occurring or legislative.**

Broad Mineral Commodity Coverage (>85 Commodities)

Period	1	18											18					
	I A											VIII A						
	1s	1	2											2				
	1s	H hydrogen 1.008	He helium 4.003											He helium 4.003				
	2s	3	4											5				
	2s	Li lithium 6.941	Be beryllium 9.012											B boron 10.81				
	3s	11	12											13				
3s	Na sodium 22.99	Mg magnesium 24.31											III A					
4s	19	20	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
4s	K potassium 39.10	Ca calcium 40.08	III B	IV B	V B	VI B	VII B	VIII B	VIII B	VIII B	I B	II B	III A	IV A	V A	VI A	VII A	VIII A
5s	37	38	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
5s	Rb rubidium 85.47	Sr strontium 87.62	Sc scandium 44.96	Ti titanium 47.87	V vanadium 50.94	Cr chromium 52.00	Mn manganese 54.94	Fe iron 55.85	Co cobalt 58.93	Ni nickel 58.69	Cu copper 63.55	Zn zinc 65.41	Al aluminum 26.98	Si silicon 28.09	P phosphorus 30.97	S sulfur 32.07	Cl chlorine 35.45	Ar argon 39.95
6s	55	56	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
6s	Cs cesium 132.9	Ba barium 137.3	Y yttrium 88.91	Zr zirconium 91.22	Nb niobium 92.91	Mo molybdenum 95.94	Tc technetium 98	Ru ruthenium 101.1	Rh rhodium 102.9	Pd palladium 106.4	Ag silver 107.9	Cd cadmium 112.4	In indium 114.8	Sn tin 118.7	Sb antimony 121.8	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.3
7s	87	88	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
7s	Fr francium 223	Ra radium 226	Lu lutetium 175.0	Hf hafnium 178.5	Ta tantalum 180.9	W tungsten 183.8	Re rhenium 186.2	Os osmium 190.2	Ir iridium 192.2	Pt platinum 195.1	Au gold 197.0	Hg mercury 200.6	Tl thallium 204.4	Pb lead 207.2	Bi bismuth 209.0	Po polonium 209	At astatine 210	Rn radon 222
			##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
			Lr lawrencium 262	Rf rutherfordium 261	Db dubnium 262	Sg seaborgium 266	Bh bohrium 264	Hs hassium 277	Mt meitnerium 268	Ds darmstadtium 281	Rg roentgenium 272	Cn copernicium 285	Uut ununtrium 284	Fl flerovium 289	Uup ununpentium 288	Lv livermorium 292	Uus ununseptium 293	Uuo ununoctium 294
			57	58	59	60	61	62	63	64	65	66	67	68	69	70		
			La lanthanum 138.9	Ce cerium 140.1	Pr praseodymium 140.9	Nd neodymium 144.2	Pm promethium 145	Sm samarium 150.4	Eu europium 152.0	Gd gadolinium 157.3	Tb terbium 158.9	Dy dysprosium 162.5	Ho holmium 164.9	Er erbium 167.3	Tm thulium 168.9	Yb ytterbium 173.0		
			89	90	91	92	93	94	95	96	97	98	99	100	101	102		
			Ac actinium 227	Th thorium 232.0	Pa protactinium 231.0	U uranium 238.0	Np neptunium 237	Pu plutonium 239	Am americium 243	Cm curium 247	Bk berkelium 247	Cf californium 251	Es einsteinium 252	Fm fermium 257	Md mendelevium 258	No nobelium 259		
			lanthanides (rare earth metals)															
			actinides															



National Minerals Information Center – Publications



- Mineral Commodity Summaries
- Minerals Yearbook
- Mineral Industry Surveys
- Special publications
- Critical Minerals List
- Data Series
- Fact Sheets

> 600 Publications Annually

<http://www.usgs.gov/centers/national-minerals-information-center>



Customer Base – Government Agencies



Customers – Professional Associations

Minerals Science and Information Coalition

- Aluminum Association
- Association of American State Geologists
- American Chemical Society
- American Exploration & Mining Association
- American Geosciences Institute
- American Iron and Steel Institute
- Essential Minerals Association
- Geological Society of America
- National Electrical Manufacturers Association
- National Mining Association
- National Slag Association
- National Stone, Sand and Gravel Association
- Portland Cement Association
- Recycled Materials Association (ISRI)
- Society of Economic Geologists
- Society for Mining, Metallurgy and Exploration

How does NMIC collect domestic mineral data?

- **Periodical statistical surveys (Monthly, quarterly, semi-annually, annually)**
 - Paper and electronic
- **More than 140 individual surveys conducted**
 - Sent to metal and industrial minerals consumer, miners, and processors
- **Surveys span the entire mineral economics cycle**
 - Production
 - Consumption
 - Recycling
 - Stocks
 - Shipments



G30

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 U.S. GEOLOGICAL SURVEY
 986 NATIONAL CENTER
 RESTON, VIRGINIA 20192

**SLAG
 IRON AND STEEL - SOLD OR USED**

**INDIVIDUAL COMPANY
 DATA - PROPRIETARY**

Unless authorization is granted in the section above the signature, the data furnished in this report will be treated in confidence by the Department of the Interior, except that they may be disclosed to Federal defense agencies, or to the Congress upon official request for appropriate purposes. Unless objection is made in writing to the USGS, the information furnished in this report may be disclosed to the respondent's State Geological Survey (or similar State Agency) if the State has appropriate safeguards to prevent disclosing company proprietary data.

**FACSIMILE NUMBER: 1-800-543-0661
 E-MAIL: nmic_canvass_forms@usgs.gov**



(Please correct if name or address has changed.)

Paperwork Reduction Act Notice: Public reporting burden for this voluntary collection of information is estimated to average 30 MINUTES per response. A Federal agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. Comments regarding this collection of information should be directed to: U.S. Geological Survey, gs-info_collections@usgs.gov. **Please do not mail canvass forms to this address.**

Collection of nonfuel minerals information is authorized by 30 U.S.C. 1601 et seq. and the Defense Production Act. This information is used to support executive policy decisions pertaining to emergency preparedness, national defense, and analyses for minerals legislation and industrial trends. The USGS relies on your voluntary and timely response to assure that its information is complete and accurate.

Please complete a separate form for each installation that was active during the reporting period. If there is more than one plant at your installation, consolidate quantity and value data for all plants producing similar materials. Please use the enclosed envelope, fax to the above toll-free number, or e-mail to the above address **WITHIN 30 DAYS AFTER RECEIPT**. If you do not have exact data, please enter your best estimates. Use zero (0) when appropriate. Do not report decimals or fractions. Report quantities to the nearest short ton and value to the nearest dollar. If you have nothing to report, please complete Item 1, sign, and return the form. Please do not make entries in shaded areas. Please use the space for "Remarks" to provide any specific information that will help us in the use or interpretation of the data. Any statement on the effect of changes in economic conditions upon the reporting establishment will be useful. Additional forms are available upon request.

If you have any questions concerning completion of this form, please contact the Mineral Commodities Data Unit, U.S. Geological Survey, 985 National Center, Reston, VA 20192, Telephone (703) 648-7960.

1a. Name and location of slag processing plant.

Name _____

City/town _____ County _____ State _____

Did you have the processing contract all year? Yes No If not, please show date _____ of contract's start/finish (indicate which)

If this is a new contract, please indicate the past contract holder _____

If you lost the contract, please indicate the new contract holder _____

1b. Name of iron or steel company and location of plant being serviced.

Company name _____ City/town _____ State _____

2. Number of plants serviced, by slag type.

A. Blast furnace slag.			B. Steel furnace slag.		
	Active plant	Old slag pile		Active plant	Old slag pile
Air-cooled			Open hearth		
Expanded or pelletized			Basic oxygen		
Granulated*			Electric arc		
			Other (e.g., induction)		

*If underground granulated slag is imported, please indicate country(ies) of origin: _____

3. Tons of slag sold and method of transportation.

A. Tons of slag sold.			B. Method of transportation		
	Code	Short tons		Code	Percent
Total slag sold	399		Truck	301	%
			Train	302	%
			Boat, barge	303	%
			Consumed at plant	304	%
			Returned to steel plant	306	%



4. Quantity and value of iron and steel slags sold, by use.

Use	Code	BLAST FURNACE SLAG								STEEL FURNACE SLAG	
		Air cooled		Expanded or pelletized		Ground granulated ¹		Unground granulated		Quantity (short tons)	Value (\$/st)
		Quantity (short tons)	Value (\$/st)	Quantity (short tons)	Value (\$/st)	Quantity (short tons)	Value (\$/st)	Quantity (short tons)	Value (\$/st)		
AGGREGATES:											
Ready mix concrete.....	401										
Lightweight concrete.....	402										
Concrete products ²	403										
Asphaltic concrete.....	405										
Road bases & surfaces ³	406										
Fill.....	407										
Railroad ballast.....	408										
Roofs, built-up, shingles.....	410										
CEMENT:											
Clinker manufacture ⁴	417										
Cementitious additive ⁵	418										
OTHER:											
Mineral wool.....	409										
Sewage treatment.....	411										
Soil conditioning.....	412										
Glassmaking.....	413										
Other (please specify)	414										
Other (unspecified).....	416										
TOTAL SLAG SALES.....	499										

^{1/} Include the amount of ground granulated slag within any blended cement or other cement products sold.

^{2/} Includes brick, block, slab, tile, and pipe.

^{3/} Includes road metal. Excludes asphaltic surfaces (enter as asphaltic concrete).

^{4/} Raw material feed to a kiln to make clinker for portland cement.

^{5/} Additive to make blended or masonry cement; grinding aid in cement manufacture; partial substitute ("slag cement") for portland cement in concrete.

Remarks: (Comment on plant upgrades, exhaustion of slag piles, gain or loss of contracts, or changes in ownership or operational status of steel company being serviced)

Name of person to be contacted regarding this report _____ Telephone _____ Email _____

Address _____ City _____ State _____ ZIP Code _____

May tabulations be published which could indirectly reveal the data reported above? Quantity data (1) Yes (2) No Value data (1) Yes (2) No

Signature _____ Title _____ Date _____



Key items from G30 Iron and Steel Slag form

- Name/location of slag plant
- Name of iron or steel company serviced
- Number of plants serviced, by slag type
 - Blast furnace – air cooled, granulated, or expanded/pelletized
 - Steel furnace – basic oxygen or electric arc
- Total tons and transportation method
- Quantity and value of slag types by end use

Spreadsheets of data can be accepted in lieu of canvass forms if it is more convenient to send in that format – USGS can do the data entry

OPTIONS SCREEN

Submit new response :

Select the Canvass / Commodity, Respondent ID, Report Period [if not annual] and Report Year. Click the Submit button.

Modify previous response :

Select the Canvass / Commodity, Respondent ID, Report Period and Report Year. Click the Modify button.

Review and edit :

Select the Canvass / Commodity, Report Period [if not annual] and Report Year. Click the Review and Edit button. All pre- and post-edit responses for the specified time period will be displayed. If the Report Period [if not annual] and Report Year correspond to the current month and year (the month and year of today's date), then this listing will also include any pre-edit responses modified by external users from any previous time period.

Note: You should periodically query for such modified responses.

Delete post-edit response :

Select the Canvass / Commodity, Respondent ID, Report Period [if not annual] and Report Year. Click the Delete post-edit response button to delete the post-edit response.

Note: This option will not delete the pre-edit response which, upon request, can only be deleted by the MIDS Administrator.

Non-MIDS Respondents :

Select the Canvass / Commodity, Report Period [if not annual] and Report Year. Click the Non-MIDS respondents button to retrieve a list of respondents not registered with MIDS for whom data was entered via the MIDS interface.

[Other Options](#)

OPTIONS SCREEN	
Report Year	<input type="text"/> Please format: YYYY. For example: 2024
Canvass / Commodity	<input type="text" value="Please Specify"/>
Report Period	<input type="text"/>
Respondent Code	<input type="text"/>

Recent response rate

■ 2022

- 9 companies of about 24 slag processors
- 70 out of about 123 sites (iron and steel plants, imported slag grinding operations, and old slag pile processors)
- 7.5 million tons of about 16 million tons (MCS 2024 estimate)
- Estimates are from iron and steel production, past responses, and import data (granulated slag only), but decrease the reliability of the data.

■ 2023

- Fewer!
- Second mailout for 2023 is upcoming

Ferrous Slag Sold in the United States
(million metric tons and million dollars)

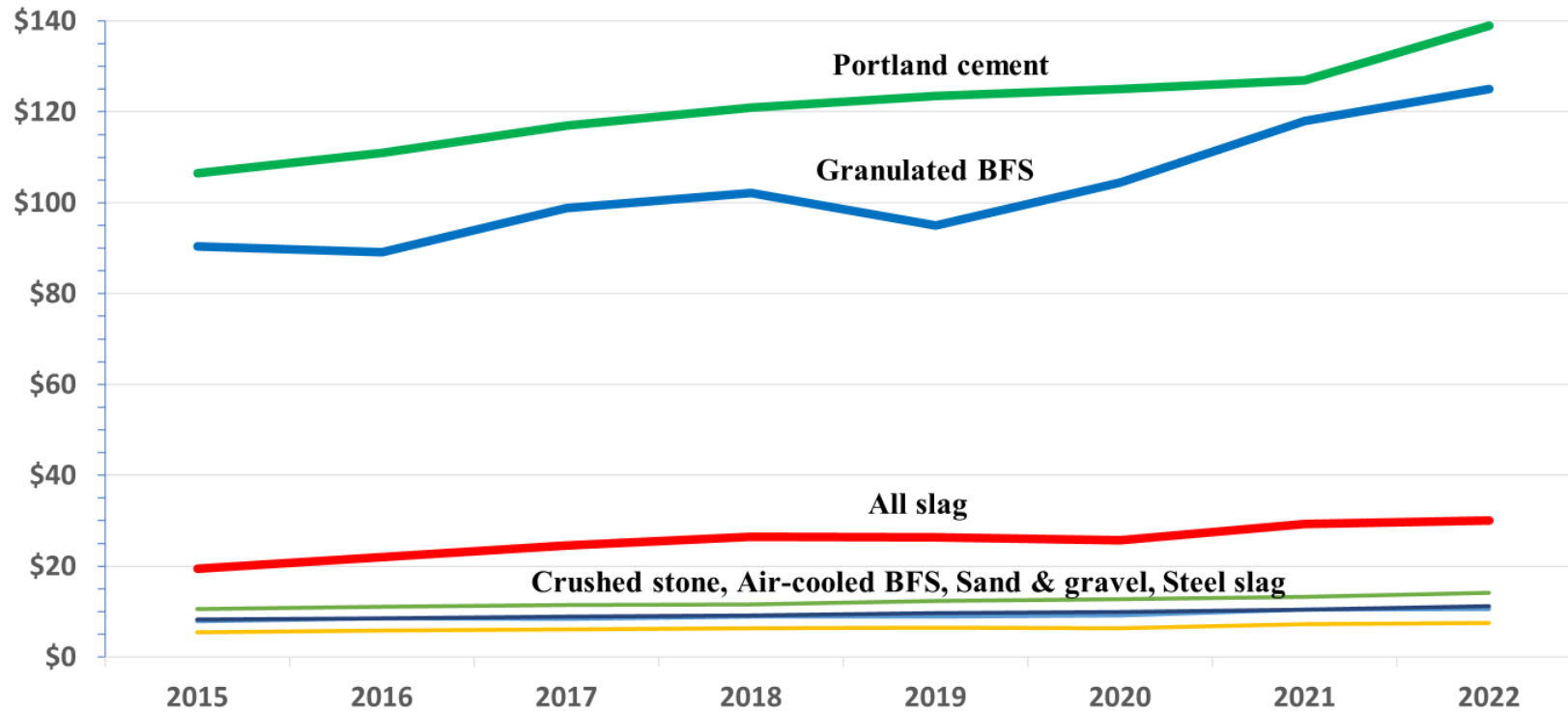
	2021					2022 (estimated)				
	Blast furnace slag ¹			Steel slag	Total slag	Blast furnace slag ¹			Steel slag	Total slag
	AC	GBFS	Total			AC	GBFS	Total		
Quantity	4.6	3.0	7.6	8.1	15.7	4.7	3.1	7.8	8.2	16.0
Value^e	48	354	402	59	461	49	388	437	61	498

Estimated

¹ Excludes expanded (pelletized) slag to protect company proprietary data. The quantities are very small (about 0.1 unit or less).

Price Trends 2015—2022

(Dollars per metric ton)



Why participate? Good publicity!

- **USGS, as a non-regulatory Federal agency, reports on the numerous beneficial end uses of slag**
 - **Substitution for natural aggregates with a plentiful iron and steel production byproduct**
 - **Substitution for portland cement for decarbonization and other benefits**
 - **Other important uses the public may not be aware of**
 - **Mineral wool insulation**
 - **Sewage treatment**
 - **Soil conditioning**
 - **Glassmaking**
 - **New uses being developed – steel slag carbon capture**
- **MYB table 4 lists slag processing companies and type of slag**

Summary - why do we care about Mineral Resources and Information ?

- **Using most of the periodic table**
- **Annual consumption at unprecedented levels**
- **U.S domestic production vs import reliance trend**
- **Long lead time for development of new resources**
- **Supply chain risk assessments**
- **Domestic economic impacts**

**Industry Participation is essential
for data quality and integrity !**



Questions?

- THANK YOU

- Elizabeth Sangine

- escottsangine@usgs.gov

- www.usgs.gov/centers/national-minerals-information-center