HB 4227: Committee on Michigan's Mining Future

House Ways and Means Committee
Wednesday, April 30, 2019

"If you don't want mining here where the minerals are, do you have a right to demand that those minerals you use everyday be mined elsewhere?"

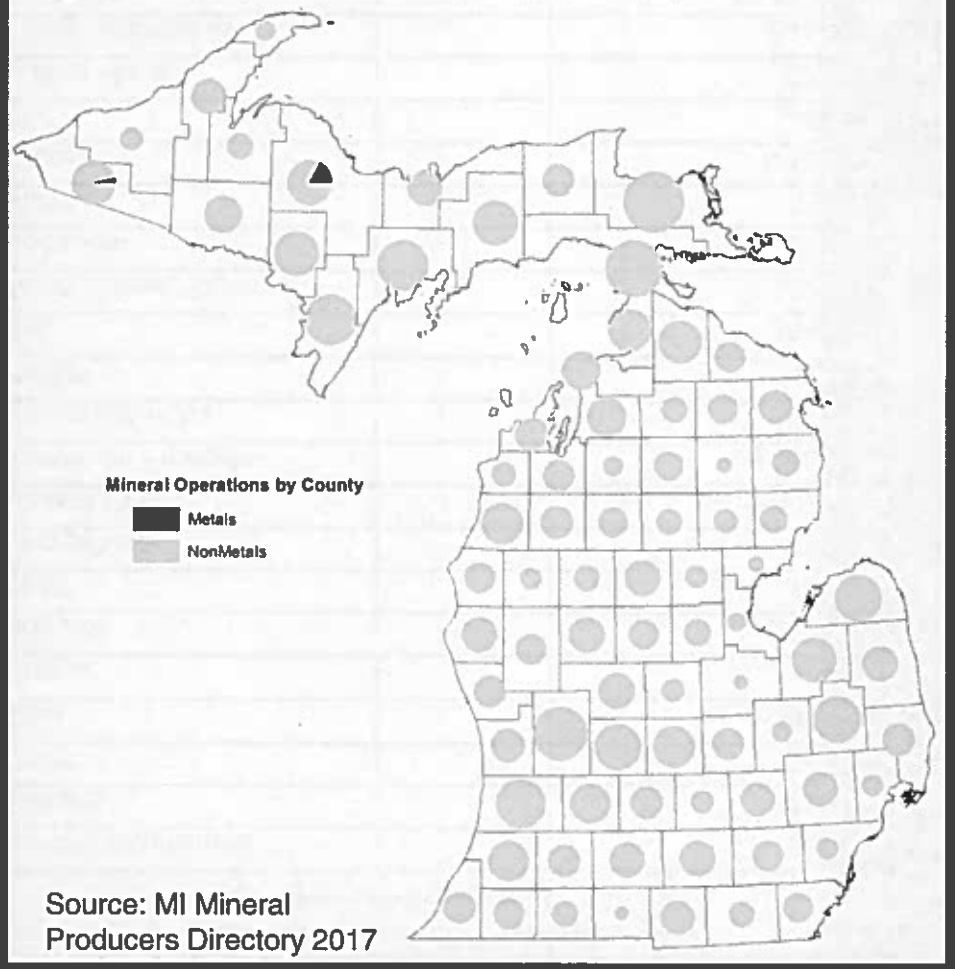
-Dr. Stephen Kesler,
U of M Emeritus Professor of Geology

Michigan is a state rich in ferrous/non-ferrous minerals, aggregates

As of the end of 2015, there were more than 600 metallic and nonmetallic mineral commodity producers and greater than 1,400 operations (mine sites) in Michigan

According to USGS data, Michigan produced **$2.79 billion** worth of metallic and nonmetallic mineral materials in 2015. For comparison, based on Treasury data, the value of oil and natural gas produced in Michigan in 2015 totaled more than **$582 million**.

Figure 2. Number of active, non-fuel mineral operations by county.



Source: MI Mineral Producers Directory 2017

Why the Mining Bill?

The Per Capita Consumption of Minerals in 2018 totaled 40,631 pounds per person

Sources: US Geological Survey; Energy Information Adm; and U.S. Census Bureau

Per Capita Consumption of Minerals - 2018 (Pounds Per Person)	
Bauxite (Aluminum)	26
Cement	675
Clays	155
Coal	4,206
Copper	12
Iron Ore	256
Lead	12
Manganese	6
Natural Gas [1/]	9,807
Petroleum Products	6,845
Phosphate Rock	182
Potash	42
Salt	384
Sand, Gravel, Stone	17,269
Soda Ash	34
Sulfur	67
Uranium	0.13
Zinc	6
Other Metals	23
Other Nonmetals	624
Total	40,631

But is Mining Safe?

- More than three dozen federal environmental laws and regulations cover all aspects of mining.
- In addition, each state has laws and regulations that mining companies must follow, including Michigan's Part 632 on metallic mining.

Federal Laws

- Some federal laws include:
  - National Environmental Policy Act,
  - Federal Land Policy and Management Act,
  - Clean Air Act, Federal Water Pollution Control Act (Clean Water Act),
  - Safe Drinking Water Act,
  - Resource Conservation and Recovery Act,
  - Comprehensive Environmental Response, Compensation, and Liability Act,
  - Toxic Substance Control Act,
  - Emergency Planning and Community Right-to-Know Act,
  - Surface Mining Control and Reclamation Act,
  - Rivers and Harbors Act, among others

Why this bill now?

- Improved coordination among stakeholders is necessary for a coherent, competitive and sustainable future for mining in Michigan that minimizes environmental impacts
- Michigan does NOT have a direct reduced iron pellet needed for modern electric arc furnaces that are the way of the future, and which are necessary for recycling used steel

'To grow in this market, you have to get into DRI'

By LEE BLOOMQUIST/For BusinessNorth Jan 3, 2018

Peter Clevenstine, Minnesota Department of Natural Resources Lands and Minerals assistant director of minerals, holds direct reduced iron.

Purpose of Bill: Balancing Short and Long-Term Needs of Michigan's Mining Industry

STATE of MINNESOTA

EXECUTIVE DEPARTMENT

TIM PAWLENTY
GOVERNOR

EXECUTIVE ORDER 03-12
PROVIDING FOR THE ESTABLISHMENT OF A GOVERNOR'S COMMITTEE ON MINNESOTA'S MINING FUTURE

I, TIM PAWLENTY, GOVERNOR OF THE STATE OF MINNESOTA, by virtue of the authority vested in me by the Constitution and the applicable statutes, do hereby issue this Executive Order:

WHEREAS, mining is an important industry to the northeast region of the state and the state as a whole; and

WHEREAS, the mining of minerals strengthens the state's economy, provides employment opportunities, and adds value to the state's natural resources; and

WHEREAS, a strong and competitive mining and minerals industry is an important component to providing a sustainable economy in northeastern Minnesota and the state as a whole;

NOW, THEREFORE, I hereby order that:

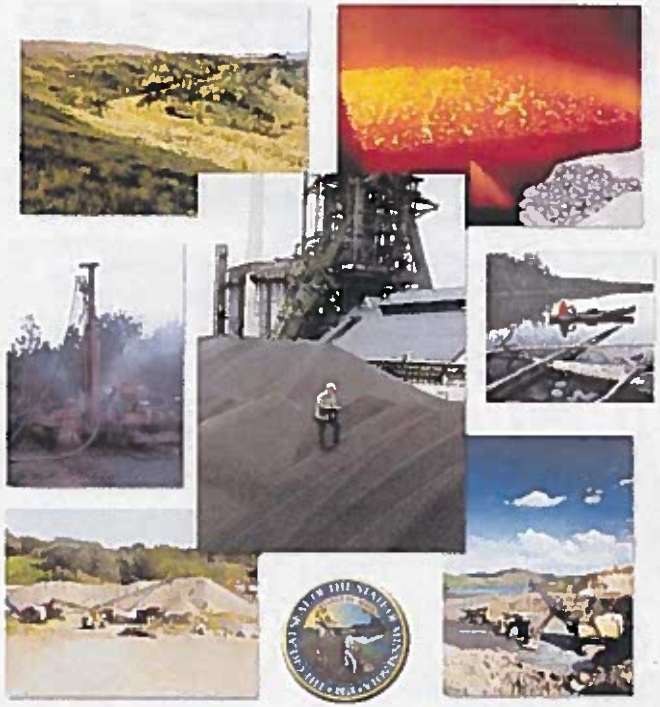
1. A Governor's Committee on Minnesota's Mining Future be established to advise the Governor in relation to the strengthening and development of a sustainable mining and minerals industry in Minnesota.

2. The Council shall also:

   a. Serve as a forum for discussion and evaluation of Minnesota's governmental policies that affect the mining and minerals industry including, but not limited to, regulations, royalties, taxation, development incentives and financing for minerals projects, environmental stewardship, and permitting;

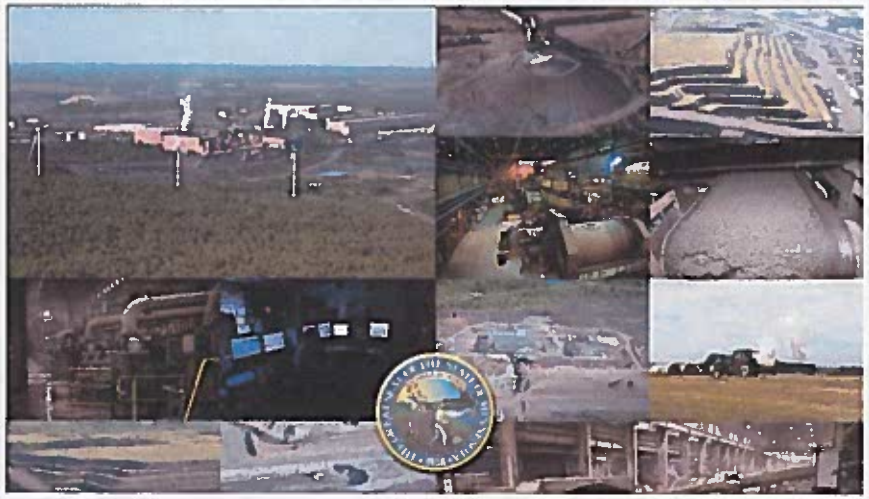
Governor's Committee on Minnesota's Mining Future

FINAL REPORT • SEPTEMBER 2004



Governor's Committee on Minnesota's Mining Future

UPDATE • OCTOBER 2008

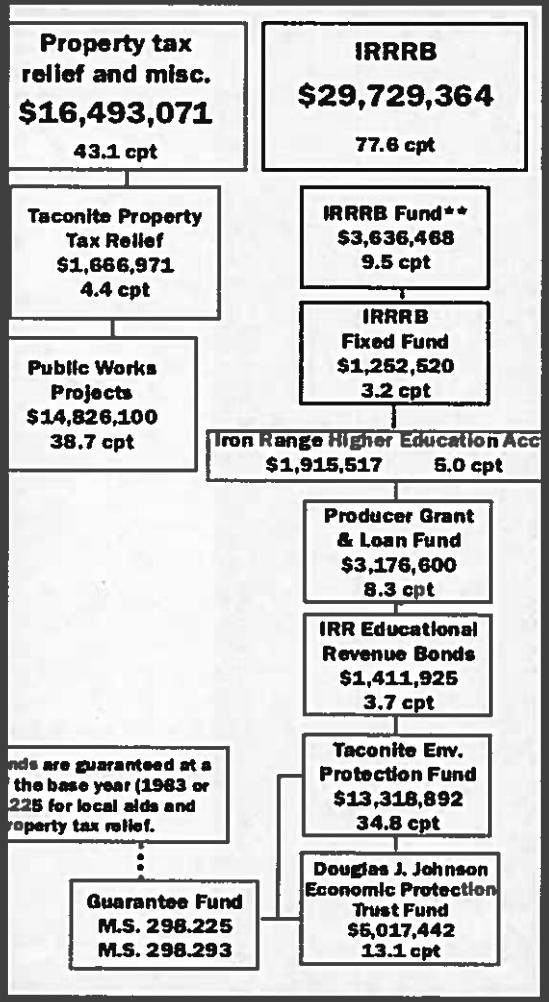


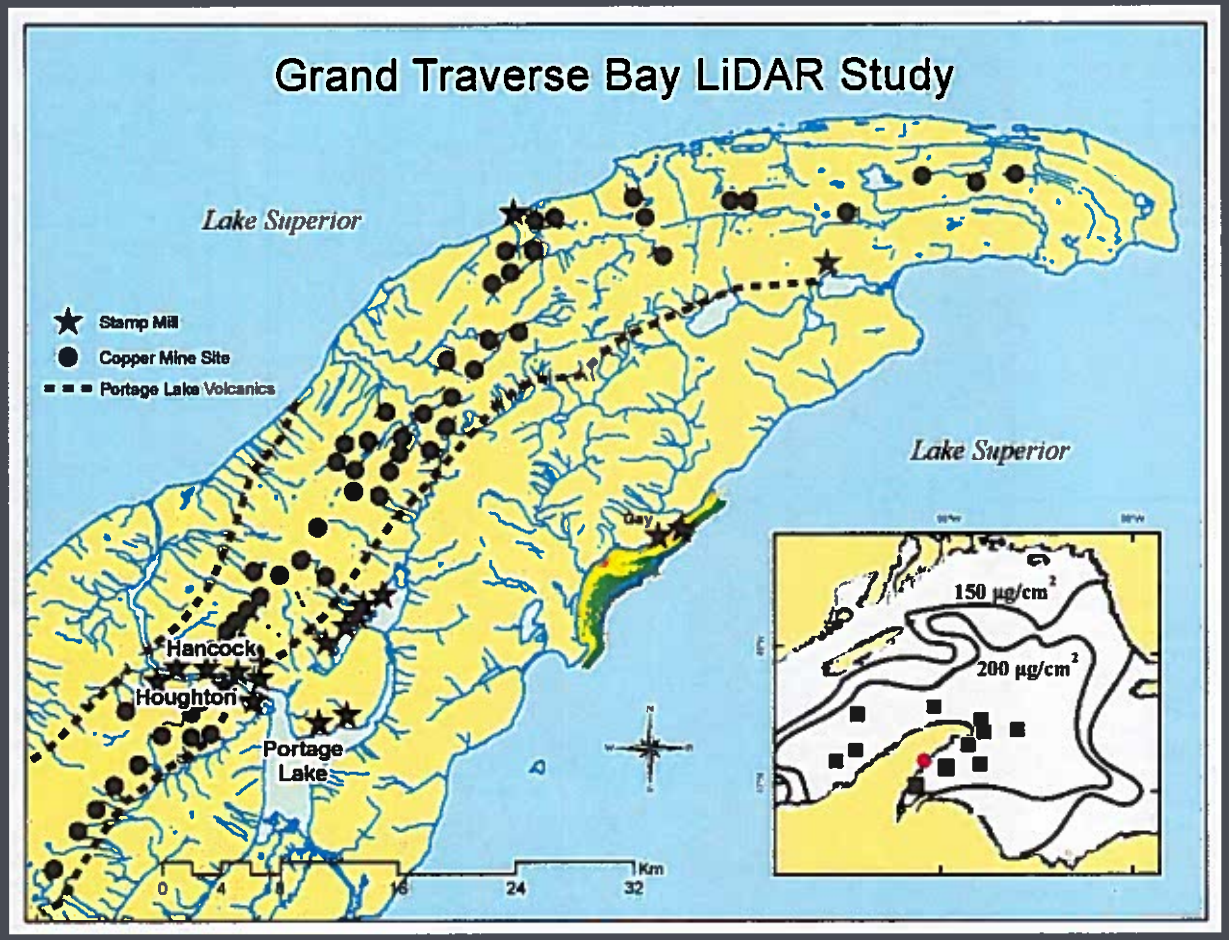
Main categories MN focused on:

Legislative and Government Policies
Environmental Quality
Applied Research
Development and Commercialization
Transportation and Energy

Michigan doesn't have...

- An Environmental Legacy Fund like Minnesota
- Which could help address legacy mining contamination sites, such as the Stamp Sands in the Keweenaw Peninsula





Stamp sand is a coarse **sand** left over from the **processing** of ore in a **stamp mill**. In the United States, the most well-known deposits of **stamp sand** are in the Copper Country of northern Michigan, where it is black or dark gray, and may contain hazardous concentrations of trace metals.

Stamp Sands in Gay, Michigan

Ontonagon Processing Mill: A Recycled future for Stamp Sands

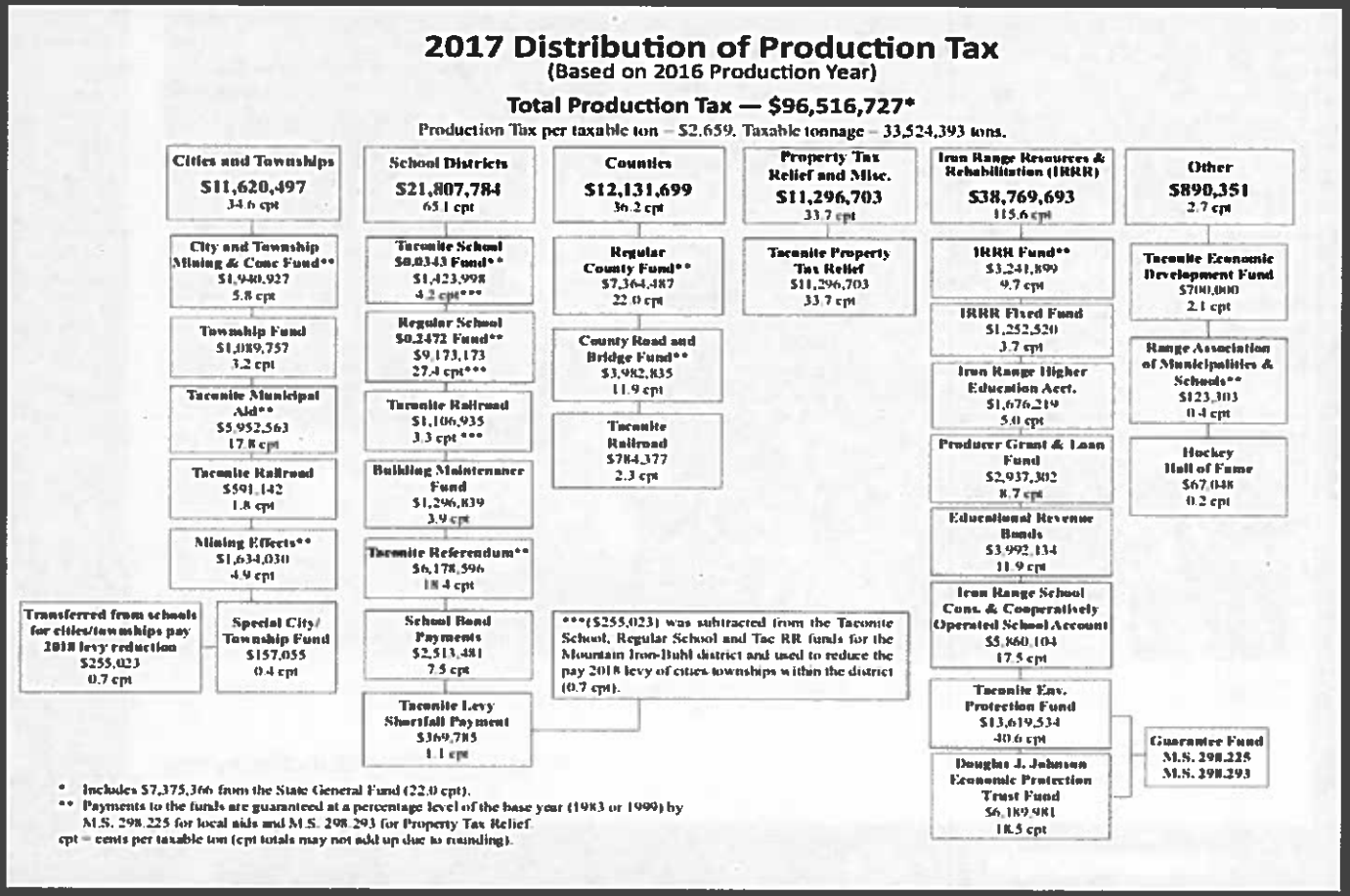
Michigan does NOT invest in any research or development of pelletization; Minnesota, Canada and Europe DO.

DEPARTMENT OF IRON RANGE RESOURCES & REHABILITATION

Taconite Economic Development Fund

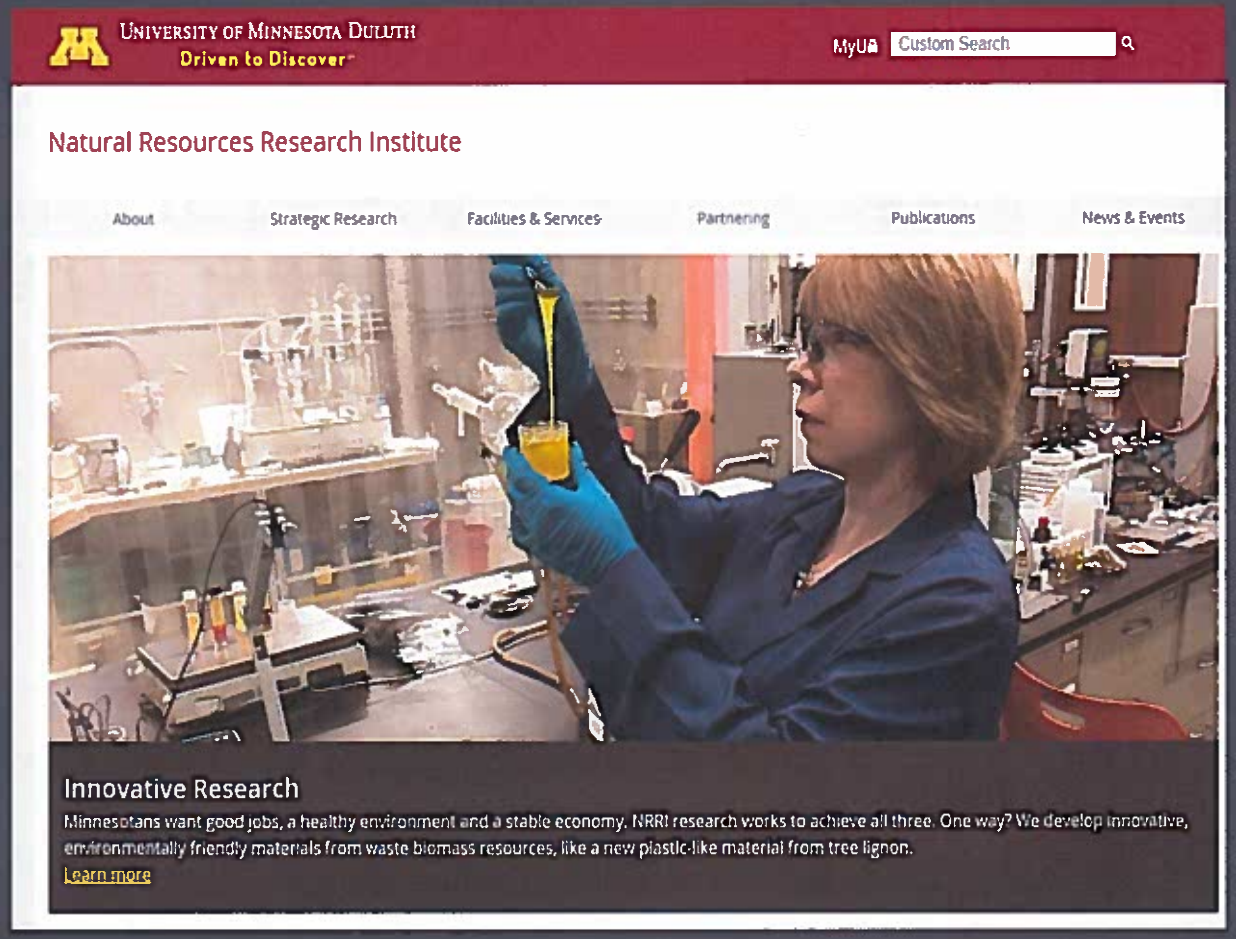
The Taconite Economic Development Fund (TEDF) is one way the agency supports our local mining industry which comprises over 30% of our regional economy. Each iron ore producer is eligible for a tax rebate of $0.251 per ton of iron concentrate produced annually. The producer must match the tax rebate dollar for dollar. The Taconite Production Tax, paid by each mining company in lieu of property taxes, is based on the annual amount of tonnage plus chips and fines produced by each company. The TEDF Grant program funds operating or capital improvement projects that meet these goals. TEDF is a legislatively mandated program (Minnesota Statute 298.227).

Minnesota Production Tax 2017 Distribution: How their state funds research



University of Minnesota Duluth:

Natural Resources Research Institute



NRRI's role is as a non-partial, science-based resource that develops and translates knowledge to help define and maintain the social license by:

- Fully characterizing and defining strategic resource opportunities.
- Minimizing waste and environmental impact.
- Maximizing value from natural resource utilization.
- Maintaining/restoring ecosystem function.

NRRI is an applied research organization focused on:

- developing sustainable, natural resource-based industries.
- informing environmental management and policy.
- supporting business and entrepreneurial opportunities.
- assisting industry and communities in defining and maintaining the social license to operate.

NRRI's goal is to deliver economic and environmental solutions with both regional focus and global relevance.

NRRI Mission: To deliver research solutions to balance our economy, resources and environment for resilient communities.

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Innovative Research: Minnesota Value. Global Relevance.

Going to work for you.

NRRI's innovative research drives solutions at the intersection of economy and environment.

How can you protect the environment and work with industry?

Because NRRI is located at a major university, mining, chemical and environmental engineers working on mining-related research have access to ecology, sustainable energy and environmental research professionals for collaboration.

Resilient Communities

NRRI knows that a healthy environment generates a strong economy. And a strong economy allows people to invest in their community.

Michigan Tech: Nations First Mining School

ASISC

Academic Research for Industrial Interests:

Michigan Tech
Michigan Technological University

The Next Generation of Sustainable and Economical Mineral Processing Technologies

Chemical Engineering Department

Goals of research: lower energy consumption/reduce waste, reduce fossil fuel use and replace with renewable energy, utilize mineral processing waste products, capture pollutants before they enter the air or water

Phosphorus eaters: Using bacteria to purify Iron Ore

Michigan Tech

Phosphorus eaters—Using bacteria to purify iron ore

September 13, 2017 Kim Geiger

Features, News, Research, Research Features

Many iron ore deposits around the world are extensive and easy to mine, but can't be used because of their high phosphorus content. Phosphorus content in steel should generally be less than 0.02 percent. Any more and steel becomes brittle and difficult to work.

ReCell Center

- US Dept of Energy, in collaboration with MTU, launched its first Lithium-ion Battery Recycling Research and Development Center
- Aimed at creating national supply of recyclable lithium-based battery materials, spurring electric vehicle industry

Michigan Tech

Michigan Technological University's Lei Pan Part of First DOE Lithium-Ion Recycling R&D Center

Michigan Tech Home > **News**

By Kelley Christensen

Published 3:00 PM, February 15, 2019

Graphite bubbles form during froth flotation, a technique used in mining engineering, which forces hydrophobic materials to the top as froth (in this case, graphite), and allows valuable cathode materials to sink to the bottom so they can be recovered and recycled.

Does Michigan have as many mining jobs as other states?

Michigan

Mining Jobs - 36,491

Mining Contribution to GDP *(millions of dollars)* - 5,405

Coal Production *(millions of tons)* - 0

Electricity Generation from Coal *(% share)* - 38.1

Employment:

- Coal Mining Jobs - 1,029
- Metal Mining Jobs - 16,723
- Non-Metal Mining Jobs - 18,739

Labor Income *(millions of dollars)*:

- Coal Mining
  - Direct - 1
  - Total - 66
- Metal Mining
  - Direct - 419
  - Total - 976
- Non-Metal Mining
  - Direct - 381
  - Total - 1,030

Minnesota

Mining Jobs - 53,271

Mining Contribution to GDP *(millions of dollars)* - 7,524

Coal Production *(millions of tons)* - 0

Electricity Generation from Coal *(% share)* - 39.3

Employment:

- Coal Mining Jobs - 945
- Metal Mining Jobs - 38,415
- Non-Metal Mining Jobs - 13,912

Labor Income *(millions of dollars)*:

- Coal Mining
  - Direct - 8
  - Total - 63
- Metal Mining
  - Direct - 1,041
  - Total - 2,405
- Non-Metal Mining
  - Direct - 342
  - Total - 855

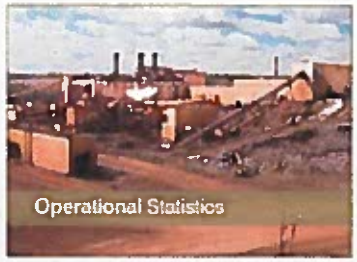
Cliffs Natural Resources: Tilden Mine

CLIFFS

CLEVELAND-CLIFFS INC.

TILDEN MINE FACT SHEET

Tilden Mine is located in Michigan's Upper Peninsula approximately five miles south of Ishpeming. Cliffs became sole owner of the mine in 2017. Operations consist of an open pit truck and shovel mine, a concentrator that utilizes single stage crushing, AG mills, magnetic separation and flotation to produce hematite and magnetite concentrates that are then supplied to the on-site pellet plant. Pellets are transported by LSSI rail to port at Marquette



Operational Statistics

- **Type of Ore:** Hematite and Magnetite
- **2017 Pellet Production:** 7.7 million tons
- **Annual Rated Capacity:** 8.0 million gross tons

Annual Economic Impact

- **Workforce:** 908 employees
- **Payroll (including benefits):** $122 million
- **Local services & supplies purchased:** $321 million
- **Michigan & local taxes:** $9 million
- **Total Economic Impact:** $452 million

Cliffs Natural Resources: Tilden and Empire Mines

(before Empire was idled)

CLIFFS

CLIFFS NATURAL RESOURCES INC.

MICHIGAN OPERATIONS — FACT SHEET

The Tilden and Empire mines operate separate mining pits and ion ore processing facilities but share a single management structure. The LSM Railroad is also part of these jointly managed operations.

Operational Statistics

<u>Empire Mine</u>

- Type of Ore: Magnetite
- 2015 Pellet Production: 3.0 million tons
- Annual Rated Capacity: 4.2 million gross tons

Through 2015, Empire Mine has produced over 270 million tons of pellets

<u>Tilden Mine</u>

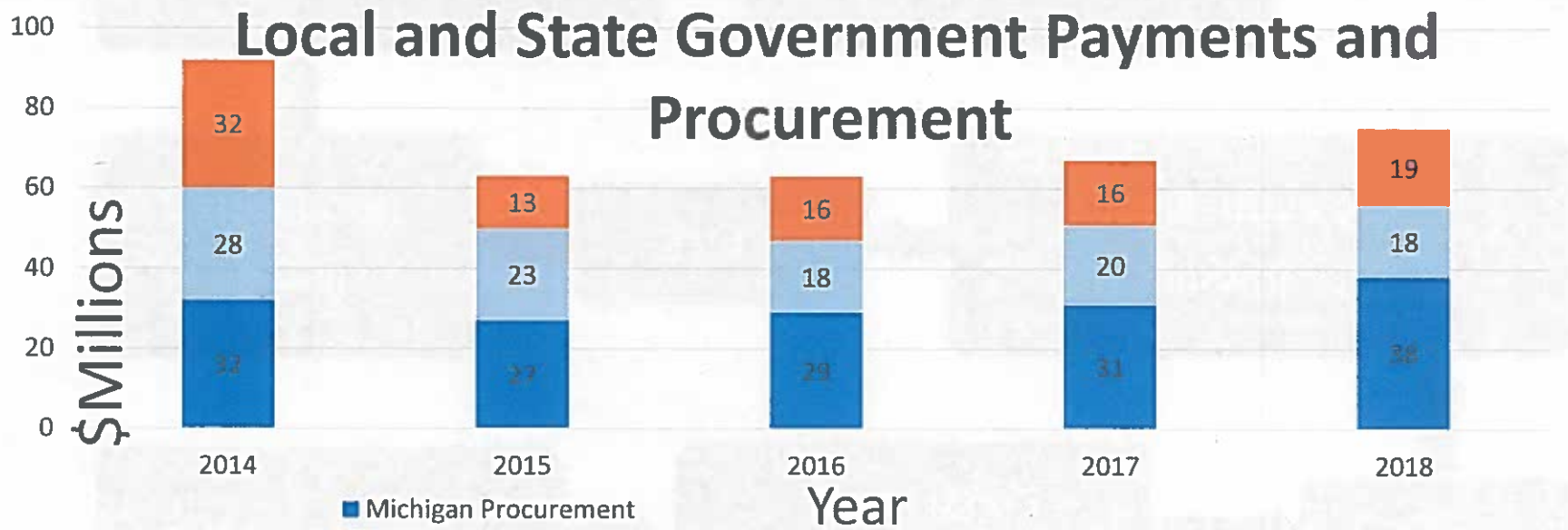
- Type of Ore: Hematite and Magnetite
- 2015 Pellet Production: 7.6 million tons
- Annual Rated Capacity: 7.8 million gross tons

Through 2015, Tilden Mine has produced over 248 million tons of pellets

Annual Economic Impact

- Workforce: 1,292 employees
- Payroll (including benefits): $173 million
- Local services & supplies purchased: $469 million
  - Includes electric power and utilities purchased: $114 million
- Michigan & local taxes: $14 million
- Total Economic Impact: $656 million

Eagle Spend

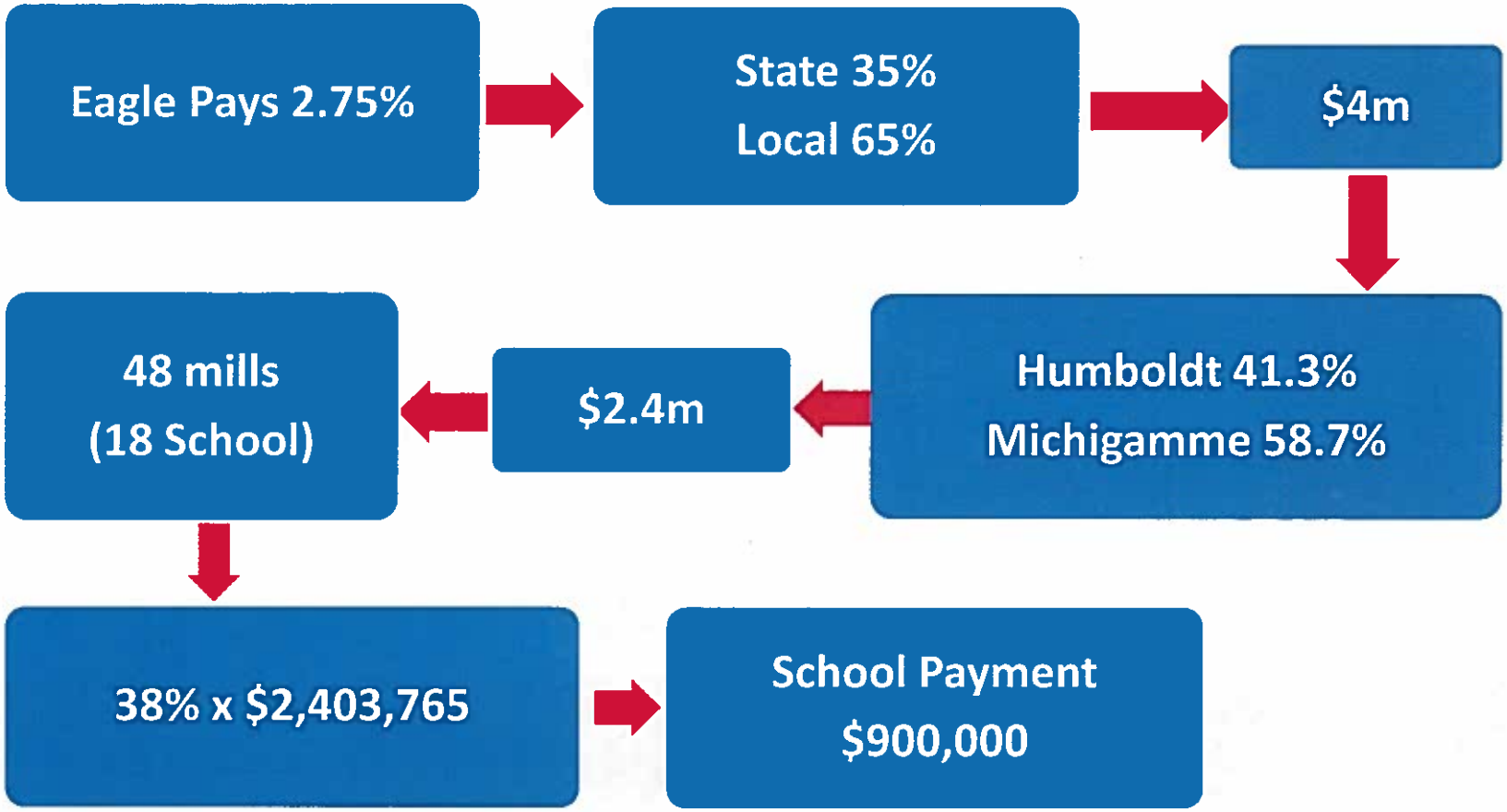


On average, Eagle pay approximately $5 to $6 per year in severance tax that is split between local government and the state of Michigan. In addition to the severance tax, Eagle pays a royalty to the State. Eagle has paid the state $36 million since in royalties since starting operations in 2014. Averaging around $8 million per year. Eagle also tracks what it spends in procurement in the Upper Peninsula and the lower peninsula. In total – Eagle has spent $360 million in procurement, taxes and royalties since we started operations in 2014.

Total Paid: $360,202,210

The state royalty goes to the natural resources trust fund, while a portion of the severance tax ($250,000) goes to the DEQ, and the remainder funds the MDARD rural development grant program.

Severance Tax Breakdown Example



The Either/Or Dilemma:

If Michigan doesn't get over the debate about responsibly using our natural resources, both our economy and environment lose.

care2 PETITIONS

MICHIGAN

Do NOT reopen the Empire Mine in Michigan's Upper Peninsula

recipient: residents of Michigan's Upper Peninsula, environmentalists, Michigan

10,283 SUPPORTERS IN MICHIGAN

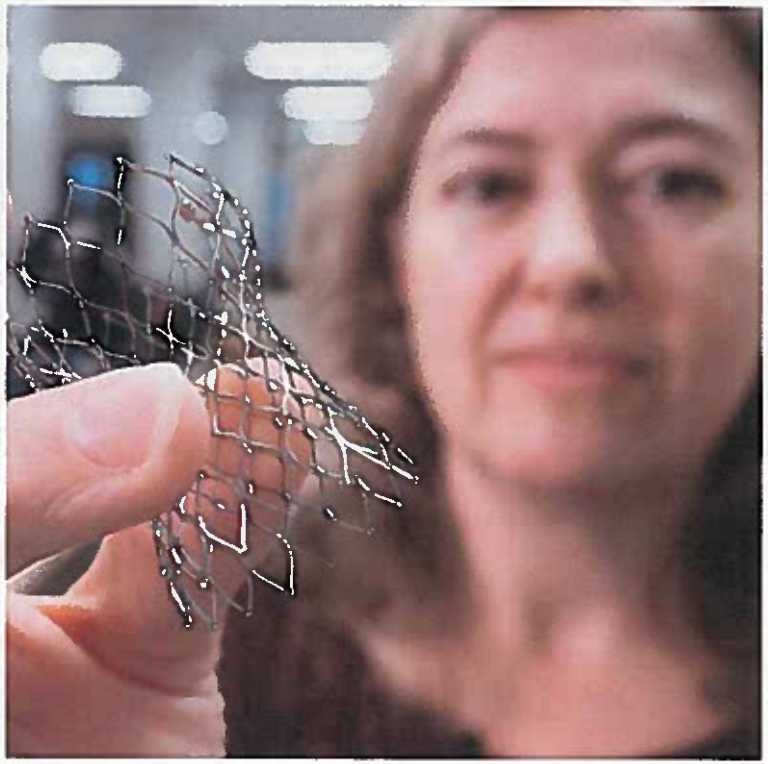
25,298 SUPPORTERS **30,000** GOAL

Cleveland-Cliffs, Inc. has mined iron ore in Michigan's beautiful Upper Peninsula for over 170 years. It was once an essential part of the local economy, culture, and heritage, but that time has long since gone. **When the profits of a handful of shareholders dried up, they closed Empire Mine, leaving local economies reeling and once pristine environments degraded and dysfunctional.**

To help change that, this bill can start conversations around mining's future...

Metal is used in medical devices:

Nitinol: malleable yet strong Nickel/Titanium allows stints to be inserted without open heart surgery



Cynthia Clague holds part of a heart valve made from nitinol

Instead of opioids for chronic pain

Medtronic spinal cord stimulation effective non-opioid treatment for chronic intractable pain

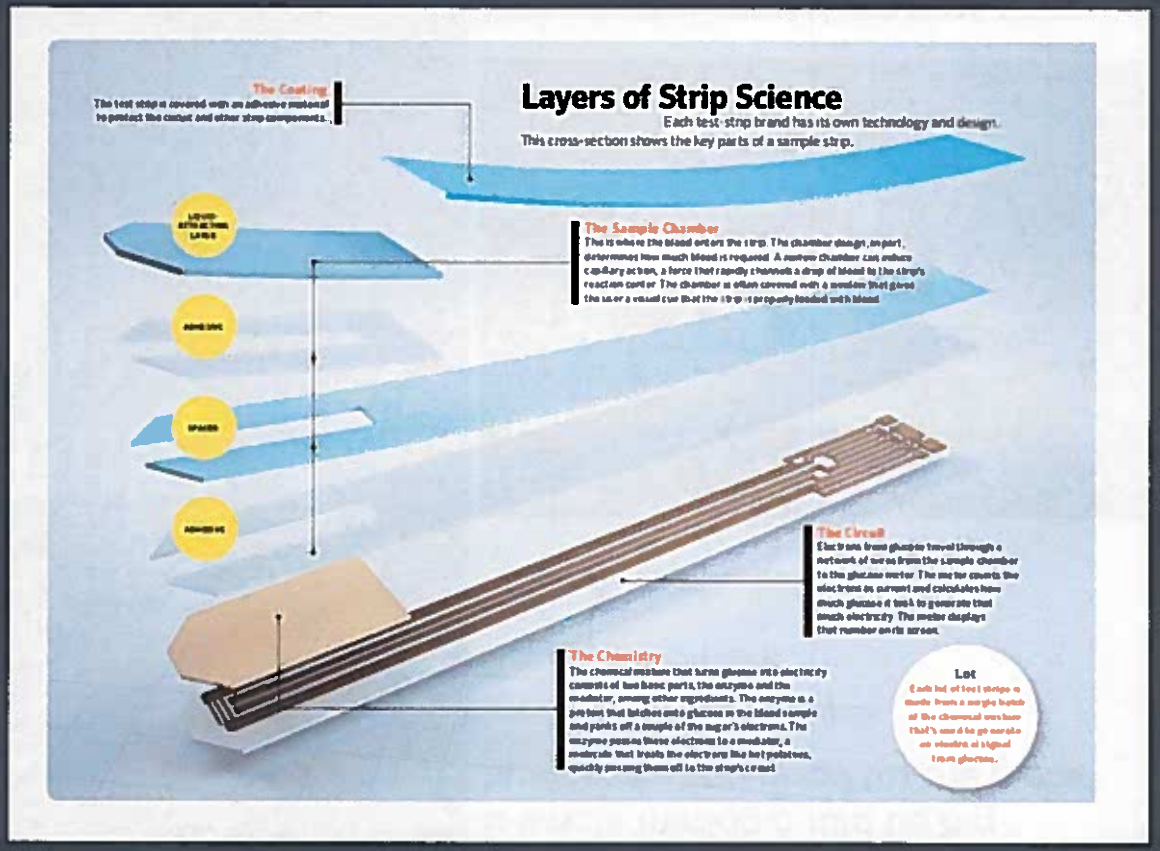
Medtronic

Menu Search

A NON-OPIOID OPTION FOR CHRONIC PAIN

Medtronic spinal cord stimulation can be an effective non-opioid treatment for chronic intractable pain.

Continuous glucose monitors for diabetics



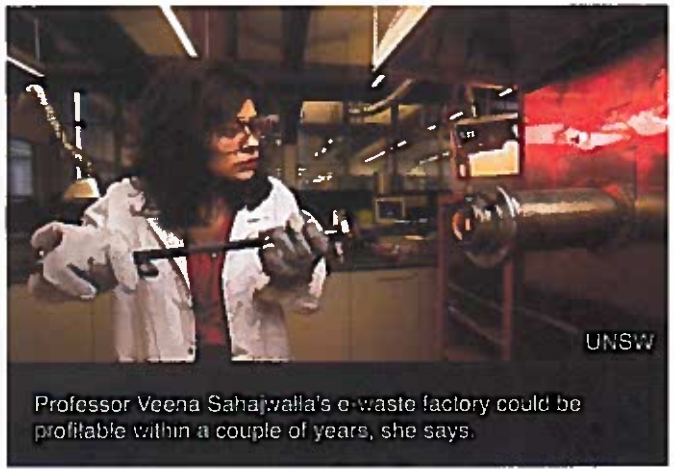
Urban Mining:

How do we recycle precious metals?

E-waste mining could be big business - and good for the planet

By Emma Woollacott
Technology of Business reporter

05 July 2018 Business



Professor Veena Sahajwalla's e-waste factory could be profitable within a couple of years, she says.

Many millions of tonnes of televisions, phones and other electronic equipment are discarded each year, despite them being a rich source of metals. But now e-waste mining has the potential to become big business.