
Gensource
POTASH CORP
Changing the Game:
An Environmentally, Socially, and Market Sustainable Approach to Potash Mining
CIM Montreal: April 29, 2019
TSXV:GSP
Paul Neufeld, Project Manager

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Presentation Contents

- Gensource Potash Corporation
  - Who is Gensource
    - Our “Why”
    - Our “How”
    - Our “What”
- Creating Better Outcomes
- Building for the Future


Who is Gensource Potash?

Who is Gensource Potash Corporation?

- **Gensource Potash Corporation (Gensource)**
  - Innovative potash start-up
  - Saskatchewan-focused
  - Publicly-traded (GSP.V)
  - Aim to revolutionize the way potash is mined and marketed…**but WHY?**

Image Courtesy of Gensource

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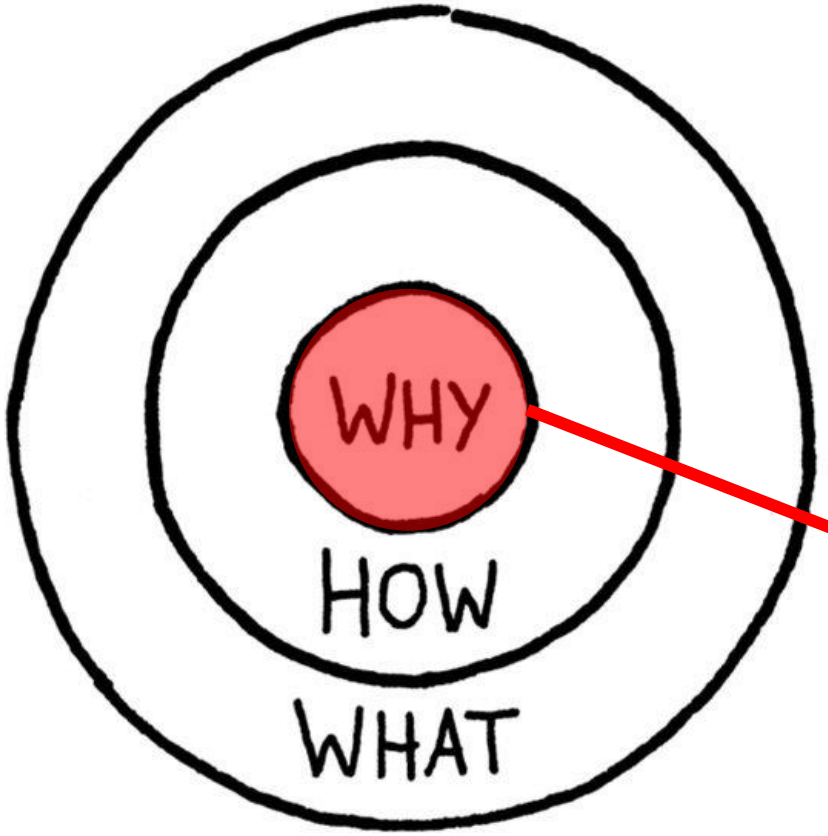
Start with your "Why"[1]



What

Every organization on the planet knows WHAT they do. These are products they sell or the services they offer.

How

Some organizations know HOW they do it. These are the things that make them special or set them apart from their competition.

Why

Very few organizations know WHY they do what they do. WHY is not about making money. That's a result. It's a purpose, cause or belief. It's the very reason your organization exists.

What is Potash?

- Potash Ore (Sylvinite) = NaCl (Halite) + KCl (Sylvite)
  - Saskatchewan is the world's #1 producer of potash from sylvinite
  - ~ 95% of potash is used as agricultural fertilizer
  - Fertilizers are key to feeding the world

Image Courtesy of Gensource

"This widespread availability and use of fertilizers was arguably the industrial revolution's single most important innovation for feeding the growing population. Today, the fertilizer industry is still recognized as an indispensable component in meeting the world's current and future food needs."[2]

- Fertilizer Canada

Source: Google Images

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Problem #1: The Potash Industry is "Broken"

Supply Side

Producers Create:

- **Lack of Competition:** Potash is controlled by oligopolistic production and distribution channels
- **Lack of Price Transparency:** No price discovery on transactions, thus creating no reliable benchmarks
- **Excess Supply Capacity:** Supply add-ons to control market and keep competition out
- **Compressed Profit Margins:** Costly mining operations coupled with complex supply chain management

Demand Side

Customers Absorb:

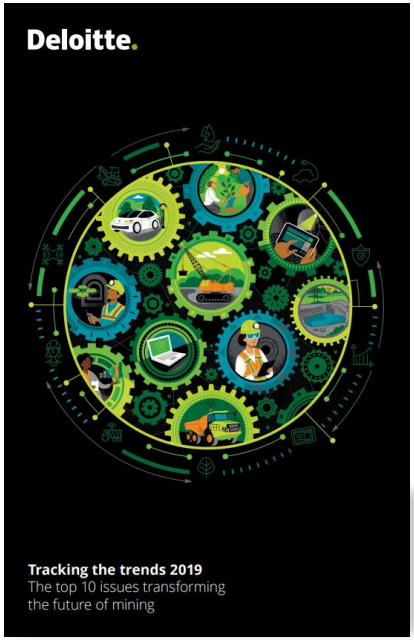
- **Lack of Competition:** Potash supply and distribution focuses on large customers, making direct access to product for smaller customers nearly impossible
- **Lack of Price Transparency:** No open market/pricing for customers to work with and negotiate from
- **Excess Supply Capacity:** Minimal choice for competitive alternatives to customers, due to oligopolies in supply and distribution
- **Compressed Profit Margins:** High delivered cost to customers and no ability to work around existing supply chain

Problem #2: Mining Practices Need to Change

"Mined materials support roughly 45% of the world's economic activities – yet large-scale mining leaves social and environmental scars"[3] - Ucilia Wang

- Deloitte's Top 10 issues transforming the future of mining (2019)[4]:
  1. Rethinking mining strategy
  2. The frontier of analytics and artificial intelligence
  3. Managing risk in the digital era
  4. Digitizing the supply chain
  5. Driving sustainable shared social outcomes
  6. Exploring the water-energy nexus
  7. Decoding capital projects
  8. Reimagining work, workers, and the workplace
  9. Operationalizing diversity and inclusion programs
  10. Demanding provenance

Source: Google Images



Source: Google Images

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Gensource Potash Corporation: Our "Why"

Vision

Achieve food security by supplying the world with a key macronutrient at an affordable cost within an open, transparent and sustainable environment.

Source: National Rural Health Alliance Inc.

"Innovations that are guided by smallholder farmers, adapted to local circumstances, and sustainable for the economy and environment will be necessary to ensure food security in the future." *– Bill Gates*

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Gensource Potash Corporation: Our "How"

Mission

Create a series of independent, scalable and environmentally sustainable Potash production facilities in Saskatchewan and other jurisdictions in the world.

Aerial View of Typical Gensource Potash "Module"

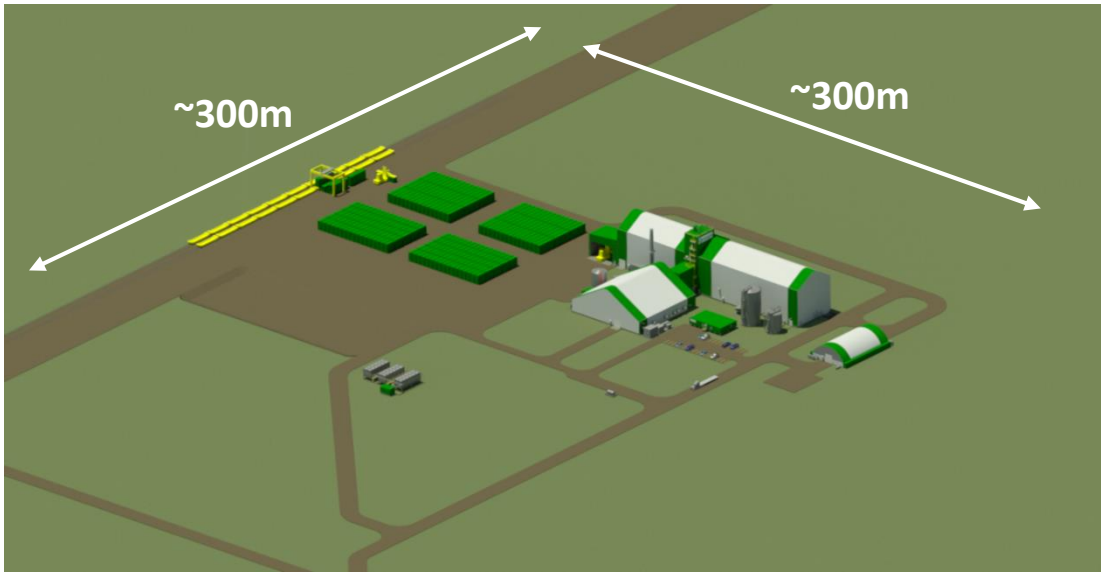

Image Courtesy of Gensource

Gensource aims to disrupt the existing potash supply chain by deploying innovative extraction methods and partnering directly with potash users

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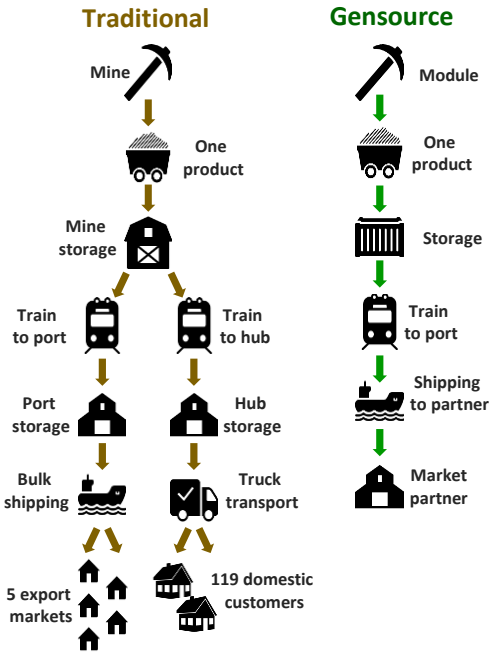
Gensource Potash Corporation: Our "How"

Customer Driven Innovation

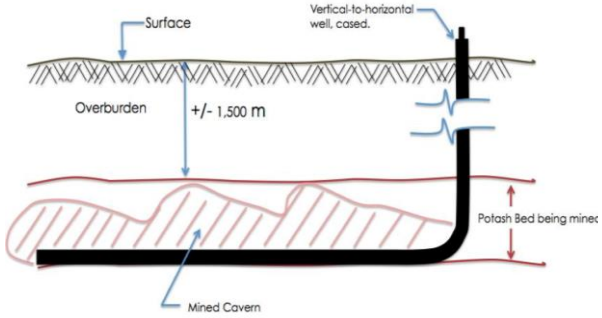
1. Supply Chain Streamlining



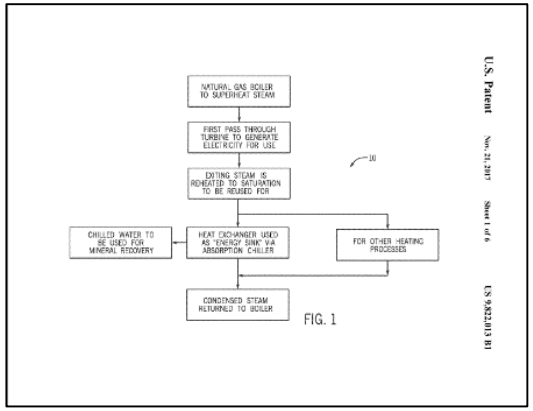
Technology Driven Innovation

2. Innovative Technologies

Selective Solution Mining

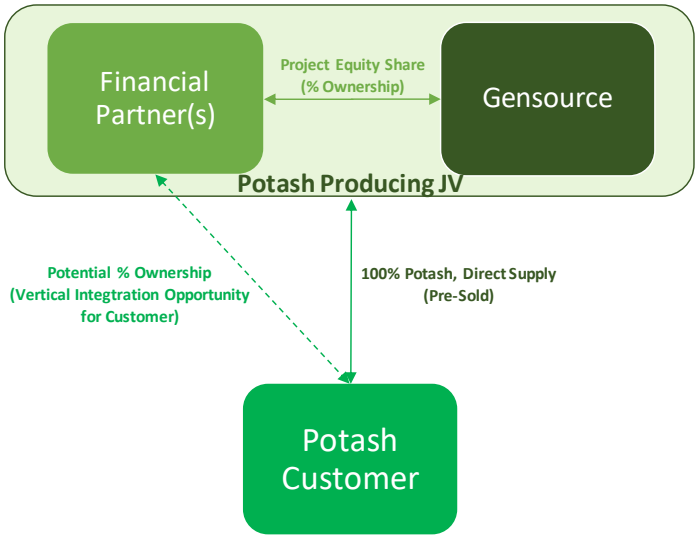


Enhanced Recovery/Processing



Business Driven Innovation

3. Creative Partnerships



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Images Courtesy of Gensource

Technological Innovation: Selective Solution Mining

- Selective Solution Mining ("Selective Extraction") of Potash (KCl) dates as far back as 1967[5]
- Simple principle - take advantage of the different chemistry
- Advancements in horizontal drilling were key for feasible application
- This method is not new!
  - Intrepid Potash: utilizing this method for 15+ years at the Cane Creek Mine (Moab, Utah)
  - Extensive list of operating solution mines using as their "secondary mining" method (including those in Saskatchewan)

Selective Extraction of Potassium Chloride from Saskatchewan Sylvinite Ore*

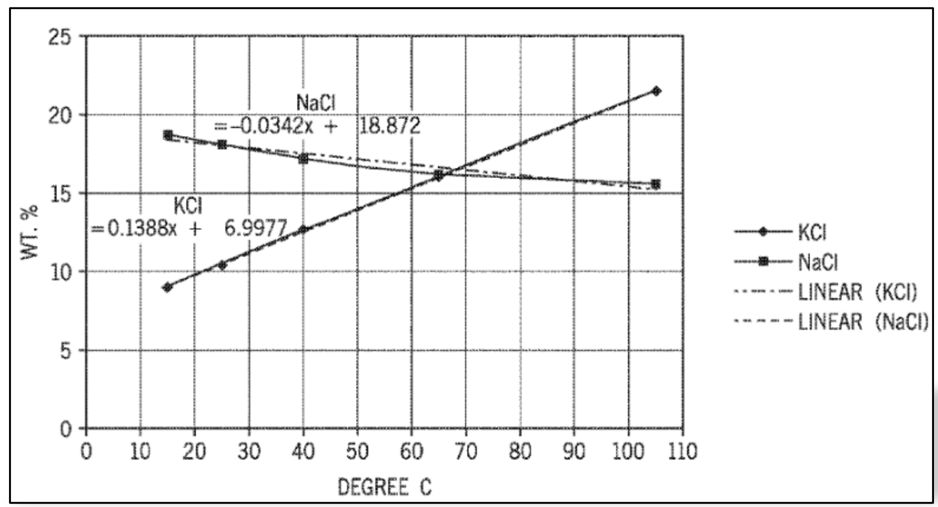
J. B. TAYLOR, M. R. HUNT, G. J. DESPAULT and A. H. AGYAKO

Division of Applied Chemistry, National Research Council, Ottawa, Ont.

*Issued as NRC No. 9518.

The Canadian Journal of Chemical Engineering, Vol. 45, April, 1967 105

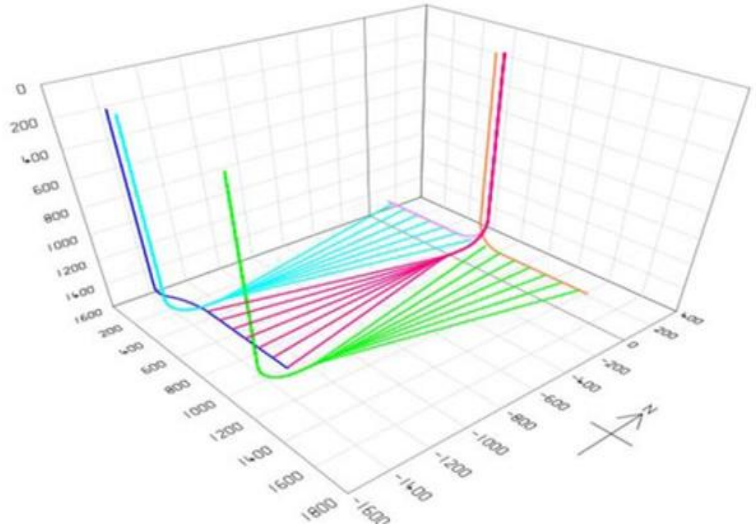
Selective Solution Mining Publication (Taylor et. al, 1967)



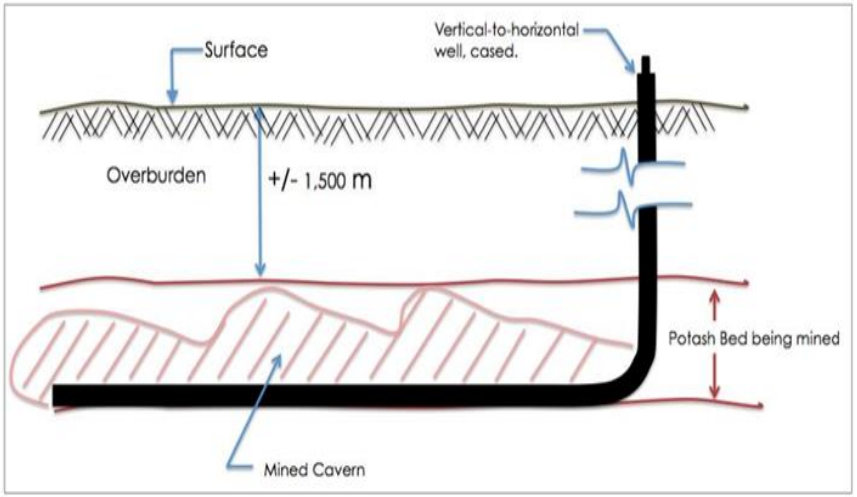
Solubility Curves (McEwan et al., US Patent 9,822,013 B1, 2017)

Gensource Selective Solution Mining Enhancements

Isometric of Horizontal Well Pattern



Cross-section of Horizontal Cavern for Selective Dissolution



- Underground horizontal caverns are created in the ore body via horizontal drilling
- Injecting a hot NaCl brine selectively dissolves the KCl (leaving NaCl in place)
- The KCl-rich brine is then pumped to the plant for processing (KCl “drops out” through cooling crystallization)
- The NaCl brine is re-heated and re-circulated back to the caverns to repeat the selective dissolution process
- No tailings are created through the process, and NaCl brine is re-used – A CLOSED LOOP!

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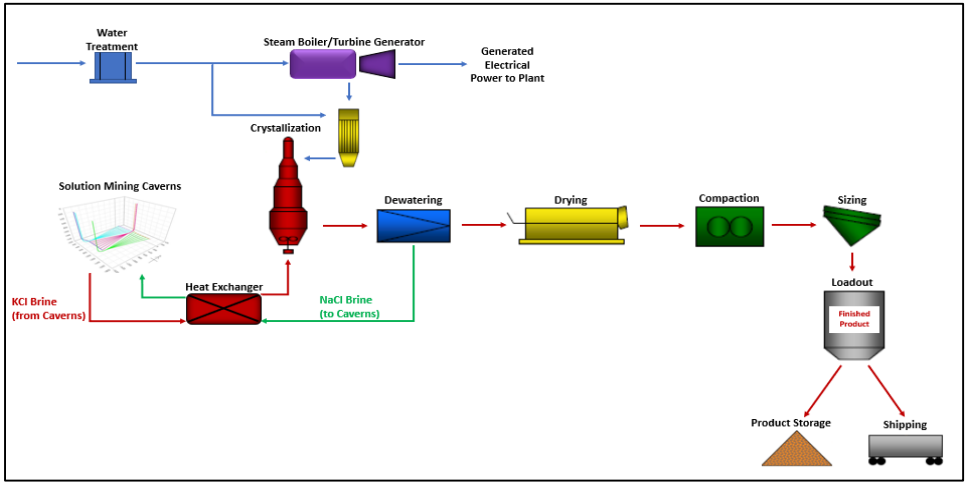
Images Courtesy of Gensource

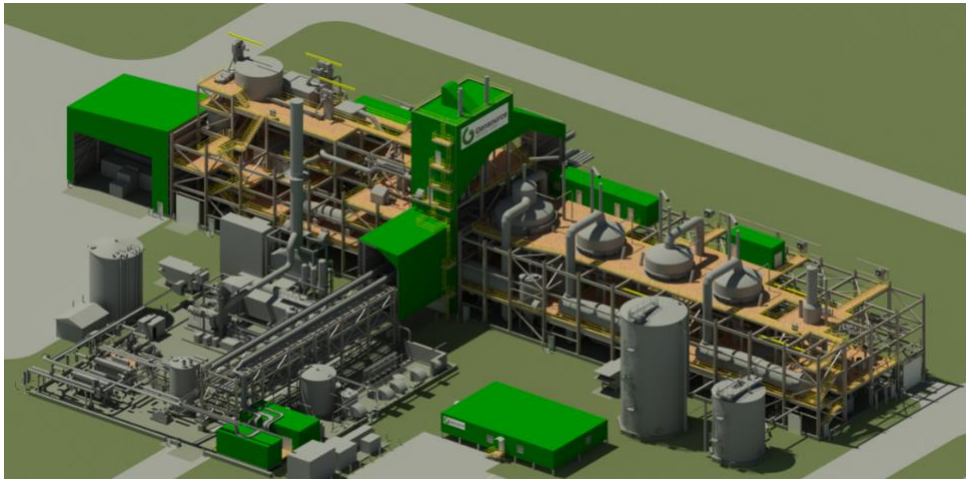
Technological Innovation: Processing/Recovery

- **Simplified Process**
  - Deploys similar potash processing techniques as every other potash operation, but simpler
- **Energy-Efficient Arrangement[6]**
  - Patent protected “Tri-generation” heat, power, and cooling process arrangement
- **Enhanced Performance**
  - The combination of the mining technique and processing arrangement allow for reduced CAPEX, reduced OPEX, and enhanced recovery – all which drive positive project economics

Simplified Process Flow Diagram



Internal View of Gensource Process Plant/Facilities



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Images Courtesy of Gensource

Gensource Potash Corporation: Our "What"

- **Small Potash Production "Modules"**
  - 250,000 tonnes/year saleable product
  - ~ $300M CAD and 2 years to build
  - ~ 40-year mine life, conservatively estimated, with centuries of resource
  - ~ $50 CAD/tonne to operate
  - Positive project economics even with lower potash prices
    - Payback period ~ 6 years
  - Easily scalable
  - Easily repeatable

Images Courtesy of Gensource

Compelling Project NPV and IRR [7]
(unlevered – 100% Equity Base Case)

Indicator	Pre Sask. Profit Tax	Post Sask. Profit Tax
NPV 8%	$329,403,545	$235,822,250
Mining	18.32%	16.31%

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Creating Better Outcomes

Outcome: Better for the Customers

- Create additional supply choice for the farmers of the world, with a product that is:
  - Produced Cleaner
  - Cheaper to Purchase
  - Consistently Available
- Create a potash industry/market that is:
  - Competitive
  - Open/Transparent
  - Sustainable

Source: Google Images

Source: Google Images

Outcome: Better for the Environment

- Traditional Mining Methods Have BIG Environmental Issues

Source: Google Earth, Modified by Gensource

A Gensource module is a mere 300 x 300 metres

Traditional Potash Mines = HUGE environmental footprint

- Massive salt tailings and brine structures on surface for indefinite period, with no remediation plans
- Large fresh water consumption for mining
- Large demand on utilities
- Large emissions
- Full EIA required before proceeding to construction licensing/permitting

Gensource potash mine = small environmental footprint

- No salt tailings or brine ponds
- Brackish groundwater can be used for mining (not fresh water)
- Reduced demand on utilities and infrastructure
  - Small Footprint
  - Self-generating power
  - Reduced GHG emissions
- No EIA required - can proceed directly to construction licensing/permitting

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Outcome: Better for the Community

- Being ~ 1/10th the size of the traditional potash project allows us to be “Right-Sized”:
  - Requires less surface land
  - Uses less resources
  - Places a lesser demand on the shared utilities
  - Is easier on the local infrastructure
  - Blends into the community
  - Provides Opportunity but doesn’t overwhelm

Source: Google Images


Building for the Future

Proof: Setting the "New Standard"

- Gensource received a determination from the Saskatchewan Ministry of Environment that the Vanguard One project is 'not a development' (August 2018)
  - Does not trigger Environmental Impact Assessment due to its positive environmental attributes
  - **1st potash project in Saskatchewan's history to receive this type of determination**
- Gensource is setting the future direction for responsible stewardship of one of Saskatchewan's most important natural resources – and it's getting noticed
  - *Article: The little potash mine that could clears a key environmental hurdle (CBC News)*
  - *Article: Gensource Given Approval to Skip Environmental Assessment (Swift Current Online)*
  - *Article: Gensource Potash Achieves Environmental Assessment Milestone (APEGS)*

"The paperwork stack for the process of a proposed potash mine in south-central Saskatchewan just got reasonably lighter. Gensource Potash Corp is looking to build near the communities of Eyebrow and Tugaske. Due to the potential building being significantly more environmentally friendly than others of its kind, the provincial government decided that it wasn't necessary for the Saskatoon-based company to complete that portion of the process."[8] – Hayley Hart

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Our Road Ahead

- Active engagement
- Education and awareness
- Fulfilling promises
- Changing attitudes
- Building Trust

Source: Google Images

Values

The core priorities for Gensource are integrity, openness and forthrightness, innovation and social responsibility.

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"People don't buy what you do; they buy why you do it. And what you do simply proves what you believe."[1] *– Simon Sinek*

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