



# **MARITIME IRON**

*Sustainable Ironmaking*

Environmental Benefits of the  
Belledune Iron Processing Facility

# INTRODUCTION

The \$1.5 billion Belledune Iron Processing Facility by Maritime Iron will be an environmentally responsible project to produce pig iron for use by electric arc furnace steelmakers in North America and Europe. This alone will result in 40% fewer global greenhouse gas (GHG) emissions. This project helps achieve our core value of *Sustainable Ironmaking*.

Steel production continues to increase by 5% per year to meet consumer demand. The industry is responding by implementing more efficient technology that increases production while also addressing more stringent environmental standards. FINEX technology is considered a game changer in the effort to substantially alter CO<sub>2</sub> emissions.

In addition, by developing our natural resources within Canada, this facility will displace some of the higher polluting processing that currently takes place in China and can replace shipments from international locations to the USA which generate more greenhouse gases from transportation.

The information presented outlines many of the environmental benefits associated with this project, both locally and globally. Data is based on the current design of the project.

## A GUIDE TO TERMINOLOGY:

- CO<sub>2</sub> = carbon dioxide (a greenhouse gas)
- EAF = electric arc furnace
- g = gram
- GHG = greenhouse gas
- Mt = million tonnes
- Mtpa = million tonnes per annum (year)
- MW = megawatts
- NO<sub>x</sub> = nitrogen oxide
- SO<sub>x</sub> = sulphur oxide
- t = tonne
- ~ = approximately



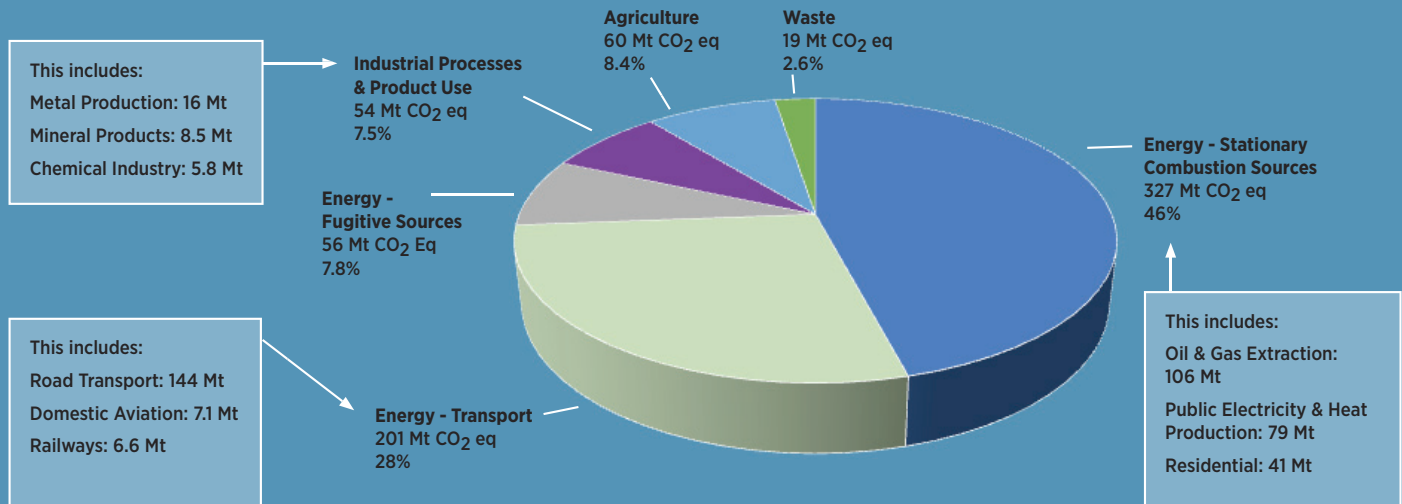
Solid Pig Iron Ingots

# CONTEXT

GHG emissions are generated from a range of personal, public, agricultural and industrial activities, such as driving a car, a public utility, or a mining company.

To understand the context for the Belledune Iron Processing Facility (as part of industrial processes and products), the pie chart below outlines emissions in Canada for all categories.

Breakdown of Canada's Emissions By Intergovernmental Panel On Climate Change Sector (2017)



# LOWER GLOBAL GHGs

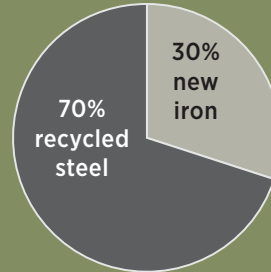


**40%**  
LOWER GLOBAL  
GHGs  
-  
Reduction of  
4.5 Mtpa of  
GHGs

## INNOVATIVE FINEX IRON TECHNOLOGY AND ELECTRIC ARC FURNACE (EAF) STEELMAKING

Innovative FINEX iron technology enables EAF steelmakers to use at least 70% recycled steel resulting in:

- 40% lower global GHGs
- Reduced steel scrapyards
- Higher yield of steel



1.5 Mtpa of FINEX pig iron enables 5 Mtpa of steel



## CONVENTIONAL IRONMAKING AND STEELMAKING

Typically uses 100% new iron to make steel and produces a lower yield of steel



1.5 Mtpa of iron enables 1.5 Mtpa of steel



# IMPROVED AIR QUALITY

## CONVENTIONAL IRONMAKING AND STEELMAKING



Conventional ironmaking and steelmaking includes coking and sintering plants resulting in:



Higher Nitrogen Oxide Levels:  
1032g/t-pig iron



Higher Sulphur Oxide Levels:  
565g/t-pig iron



Higher Coal Dust Emissions:  
20,000g/t-pig iron in China



Higher GHGs From Iron Ore Mining:  
Generates 0.2t GHG/t steel

## INNOVATIVE FINEX IRON TECHNOLOGY AND EAF STEELMAKING



No coking and sintering facilities for ironmaking resulting in:



Lower Nitrogen Oxide Levels:  
94g/t-pig iron

**91% lower**



Lower Sulphur Oxide Levels:  
32g/t-pig iron

**94% lower**



Lower Coal Dust Emissions:  
58g/t-pig iron

**99.7% lower**



No new mining required – uses existing piles of iron fines:

Displaces 0.2t GHG/t steel

# CLEANER ENERGY LOCALLY

Federal regulations mandate the phase-out of coal-fired electricity generation by 2030.



As Stand-alone Operations, GHG Emissions = 6.4 Mtpa

## PROPOSED FINEX PLANT



GHG Emissions if released directly to the atmosphere: 3.8 Mtpa

1.4 Mtpa Coal



## NB POWER BELLEDUNE GENERATING STATION TODAY



GHG Emissions from Coal: 2.6 Mtpa



Nitrogen Oxide Emissions: 5635 tpa



Sulphur Oxide Emissions: 5314 tpa

1.2 Mtpa Coal



Coal Ash: 0.043 Mtpa

# CLEANER ENERGY LOCALLY

The FINEX process generates a by-product gas that will be used by NB Power for electricity generation, allowing it to meet regulatory emission levels.



As Integrated Operations, GHG Emissions = 4.9 Mtpa

INTEGRATED FACILITIES RESULTS IN 1.5 MILLION TONNES FEWER GHGs PER YEAR



**1.5 Mtpa**  
LOWER GHGs



**NO<sub>x</sub>**  
Nitrogen Oxide  
Emissions:  
2125 tpa  
**63% lower**



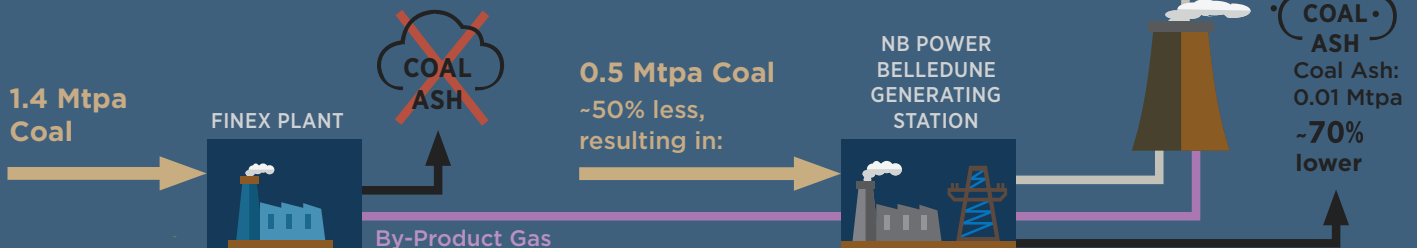
**SO<sub>x</sub>**  
Sulphur Oxide  
Emissions:  
2060 tpa  
**62% lower**



**CO<sub>2</sub>**  
GHG Emissions  
from Coal:  
1.2 Mtpa  
**54% lower**



**CO<sub>2</sub>**  
GHG Emissions  
from By-  
Product Gas:  
3.7 Mtpa



# TRANSPORT BENEFITS



**98%**

**LOWER GLOBAL  
GHGs**

GHG reduction  
of 0.6 Mtpa

## REDUCED TRANSPORTATION DISTANCES = LOWER GLOBAL GHGs

Most iron ore shipments go from Sept-Îles, Québec to China for processing. By establishing the facility in Belledune, transportation distances are greatly reduced.

Sept-Îles, QC



China  
-28,000 km

Sept-Îles, QC



Belledune, NB  
-425 km



**63%**

**LOWER GLOBAL  
GHGs**

GHG reduction  
of 0.1 Mtpa

Currently, Ukraine and Russia are a key source of pig iron for US steelmakers. The Belledune facility can meet up to 30% of US market demand for pig iron and displace transportation from elsewhere.

Ukraine/  
Russia



Key US markets  
-12,000 km

Belledune, NB



Key US markets  
-4,500 km

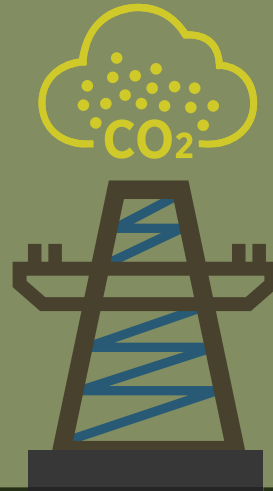


# GREENER ELECTRICAL GRID



## LEVERAGING CANADA'S GREENER ELECTRICAL GRID

Using China's electrical grid for ironmaking results in ~1.5 Mtpa indirect GHG emissions



China

Production in Canada will generate 0.6 Mtpa indirect GHGs



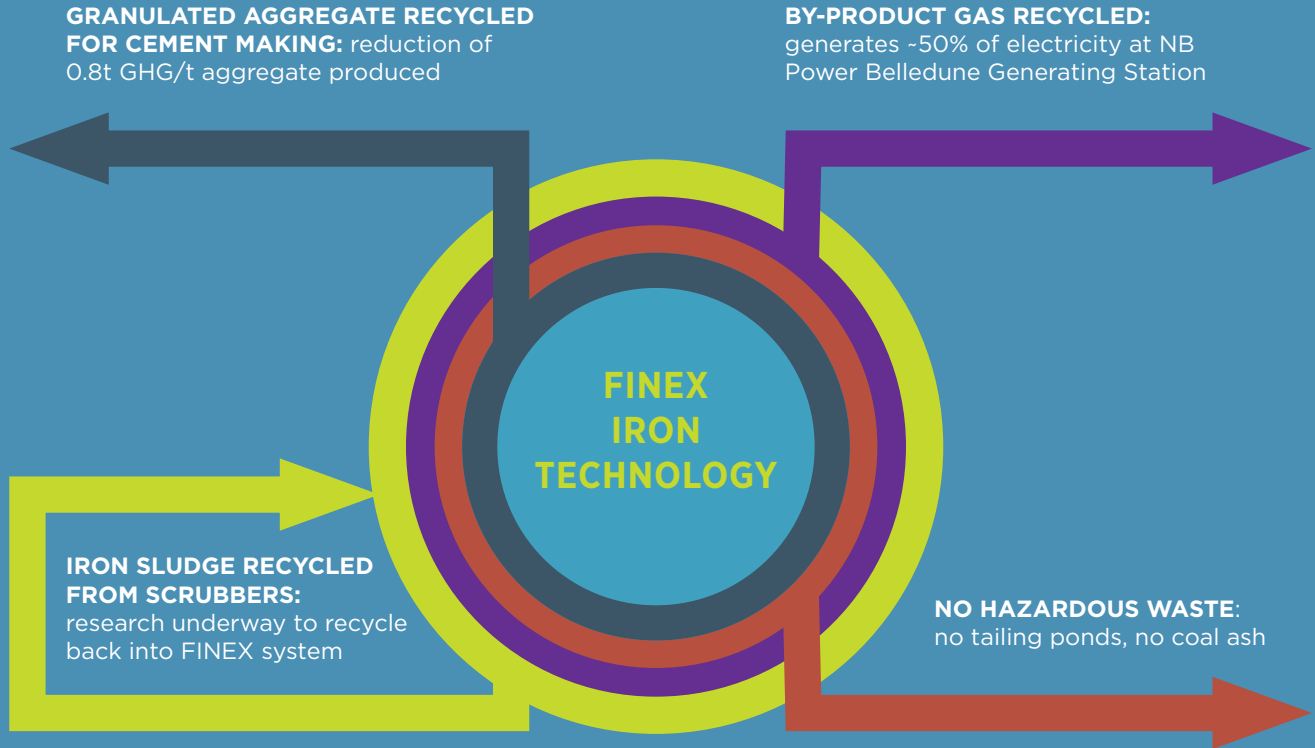
**60%**  
LOWER GHGs



Canada

# ZERO WASTE TARGET

The Belledune Iron Processing Facility helps realize a circular economy anchored in a commitment to reduce, reuse, and recycle with the aim of minimizing the use of resources and reducing waste.



# SOURCES

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Maritime Iron selected FINEX  
as the best available  
technology to achieve  
sustainable ironmaking.



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