Fastmarkets

Global Iron Ore

EUROPEAN HIGH-GRADE IRON ORE PRODUCTION

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AGENDA

- **Introduction – an overview of Europe's iron ore production**
- **How the return of Latin America and N American production affects European production**
- **Steelmaking technologies and processes that reduce emissions and influence demand for high quality iron ores**
- **Where does Nordic Iron Ore AB (NIO) fit in to European iron ore future**

IRON ORE MINING IN EUROPE (EX FSU)

Global iron ore production estimated at around 2.35bnt/y (extrapolated from Statistica 2021)

European iron ore production iron ore = 43.9Mt/y 2018 Source World Steel Statistics

- Sweden
  - LKAB – 26Mt/y (mainly pellets), some high grade concentrates
  - Kaunis Iron– 2Mt/y 68-69%Fe concentrate – expansion possibilities
  - Nordic Iron Ore - under development, DFS and optimisation complete, permits granted (4-5Mt/y planned)
- Norway
  - Moi I Rana – 2.0 Mt/y
  - Sydveranger – closed – Tacora likely to re-open @ 4Mt/y 66-68%Fe concentrates
- Germany - Small production <2Mt/y
- Finland – still being developed
- Austria – Voest Alpine, 4.8Mt/y
- Turkey – 6Mt/y
- Bosnia Herzegovina = 1.6Mt/y

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BRAZILIAN & CANADIAN IRON ORE MINING IMPACT EUROPE IRON ORE

European balance of trade in iron ore (World Steel Statistics 2018)

- Europe imports around 160Mt/y iron ore
  - Around 40Mt/y from Brazil
  - Around 25Mt/y from NAFTA

Europe relies heavily on high quality ores from the Americas

Vale is the largest single supplier to Europe – but has had production issues:

- Tailings dam issues, closed mines and requires capital to remediate
- Covid issue
- Logistics
- Investment in new resources?

Europe advantages

- Higher grades
- Proximity
- Licence to operate

- Resumption in production of quality ore from S America –playing catch-up in demand?

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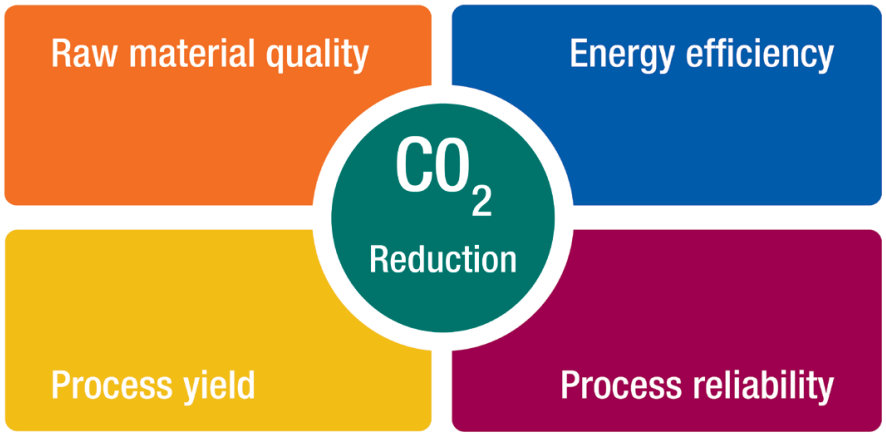
METHODS TO REDUCE CARBON FOOTPRINT

Moves that assist with reducing carbon footprint

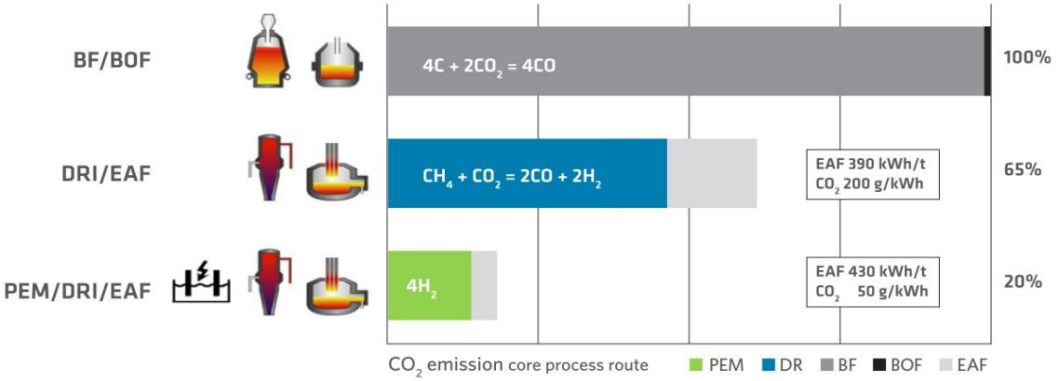
- Melt less waste materials – higher Fe content in burden
  - Use of high quality concentrates
  - DRI
  - Scrap
- Use physically more process efficient materials – ie pellets, lump, quality coke etc
- Use of “greener” raw materials – ie pellets from magnetite, local sourcing (JIT delivery)
- Introduce more effective processes where alternative fuels can be used, ie **hydrogen** in DRI and other processes
- Carbon capture
- Operate less iron-making units @ higher productivity

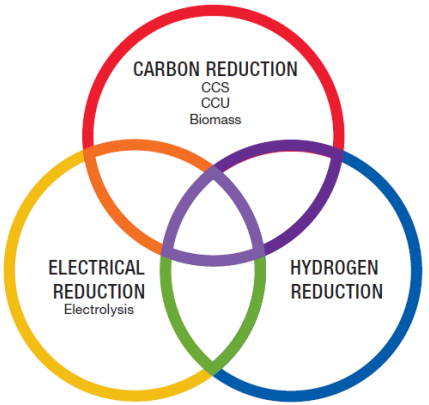
VIEW OF WHAT IS REQUIRED FOR THE STEEL INDUSTRIES

Steps to be taken to a Carbonless (“green) future



Four-stage efficiency process improvements
World Steel Association (WSA)





Three directions for steelmaking decarbonisation WSA

Source: Voest Alpine Stahl – Use of HBI in BF Griessler & Buergler

PROJECTS FOR THE FUTURE OF THE EUROPEAN STEEL INDUSTRIES

Carbonless (“green) steel – projects –all by 2050 carbon neutral?

- **Arcelor Mittal** – several underway in Germany, France and Spain. Partnered with majors such as Midrex
  - Includes EU only current DRI/EAF facility at Hamburg
- **Voest Alpine & Siemens** – Linz, Austria- green hydrogen production
- **Voest Alpine & Mitsubishi –** the plant will use hydrogen instead of coal in the reduction process for iron ore. The next-generation equipment will produce 250,000 tons of steel product a year.

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AZUSA KAWAKAMI, Nikkei staff writer December 28, 2020 06:45 JST

PROJECTS FOR THE FUTURE OF THE EUROPEAN STEEL INDUSTRIES

Carbonless (“green”) steel – projects –all by 2050 carbon neutral?

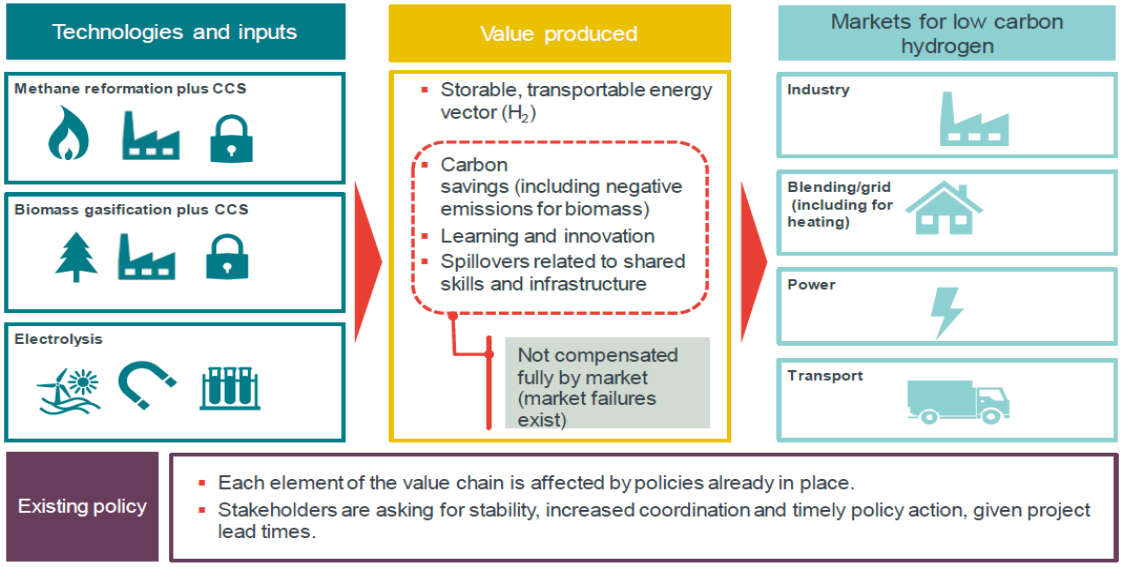
- **Thyssenkrupp**, Duisburg, Germany – reduce emissions 30% by 2030 (2018 basis), 0.4Mt/y green H_2 by 2025
- **Tata**, Ijmuiden, Holland – Hisarna
- **Dillingen/Saarstahl**, Germany –
- **Salzgitter, Avacon and Linde** commission WindH2 project
- **SSAB**, Lulea, Sweden – Partner Hybrit with Vattenfall, Tenova and LKAB. Worlds first fossil free steelmaking technology – planned USD46bn spend in next 20 years!
- **Liberty**, with Paul Worth and Stahl-Holding-Saar (SHS) in France – Electrolised H_2 DRI / EAF based steel plant – delivery of surplus DRI to Poland, Romania and Germany operations
- **H2 Green Steel**, Sweden – aims to demonstrate elimination of virtually all CO_2 emissions from the steel making process by 2024
- **GreenIron** is a Swedish company focused on cost efficient fossil free reduction of metal oxides to pure metals using well developed and existing DR technologies.

GLOBAL PROJECTS FOR THE FUTURE OF THE STEEL INDUSTRIES

Hydrogen production & Carbonless (“green”) steel - projects

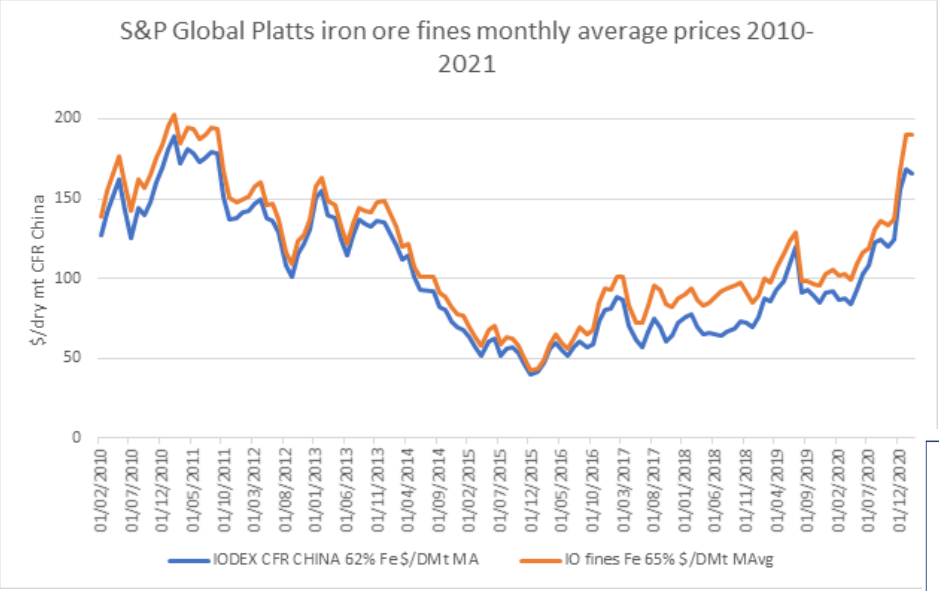
- **Nippon Steel & JFE** – Japan – introduce H_2 to replace coke
- **POSCO**, S Korea – plans carbon neutral by 2050
- **FMG**, Australia, 235GW renewables and green hydrogen
- **JFE**, Japan
- **Hazer Group** – Australia, Hydrogen production
- China – committed to major advancement of use of hydrogen in steelmaking

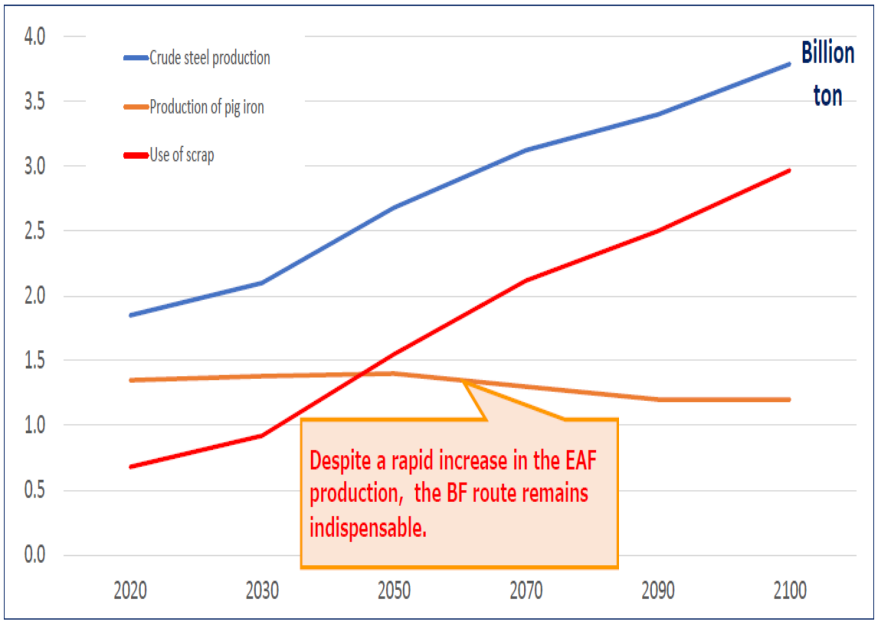
Framework for considering risks and barriers



Source: Frontier Economics

IRON ORE PRICES 2010-2021





Credit : JISF long-term vision for climate change mitigation A challenge towards zero-carbon steel

SUSTAINABLE IRON ORE PRICES

Personal view of iron ore prices

- Main drivers in the iron ore price
  - Demand up – hesitation in the market in 2020 as steel demand fell – came back strongly with Chine recovery from Covid – World Steel predicts continued increase in steel production globally for decades
  - 2013-2015 was a clear out of oversupply and a big correction in the market – unsustainably low prices
  - Sustainability of logistics – many routes from mine to market reaching capacity – maintenance replacement/expansion
  - Investment in new mine/output
    - Replacement tonnage – the opening of new or expansions is clearly not keeping up
    - Vale and other declarations output will not reach targets
    - Capital required to invest in other areas of business operations, HSE and ethical activities

The fact is that to operate a sustainable iron ore business basic iron ore prices need to be probably between $80-100/t, maybe higher!

- Reward investors
- Invest in R&D, improve product quality
- Invest in green activities, circular economy, sustainability, carbon neutrality, licence to operate etc
- Invest in new infrastructure
- Invest in new capacity

"There is a lot to suggest iron ore prices will remain relatively high for some time"

STEELMAKING OUTLOOK – HIGH GRADE IRON ORE OUTLOOK

- **Global Iron Ore**
  - Background – continued expansion of demand for iron ore for next decades
  - Imponderable – how quickly will China move to scrap based steelmaking – scrap supply?
  - Environmental impacts – higher quality in to BF – lower carbon requirements/emissions
  - New technologies – Hydrogen based steelmaking – hydrogen expensive
  - Carbon tariffs

- **European Steelmaking**
  - Strong signs it is looking to move to use DRI processes to help gradual reduction of emissions
  - EU supporting more sourcing of raw materials and key commodities locally – reduce imports
  - Carbon tax – due soon – is it going to rise to $70/t? – what will the operating licenses include
  - Hydrogen is likely to be expensive – should be a strong move to use local high quality ores
  - Europe well placed to move to more EAF steelmaking?

- **Good future for European Iron Ores?**

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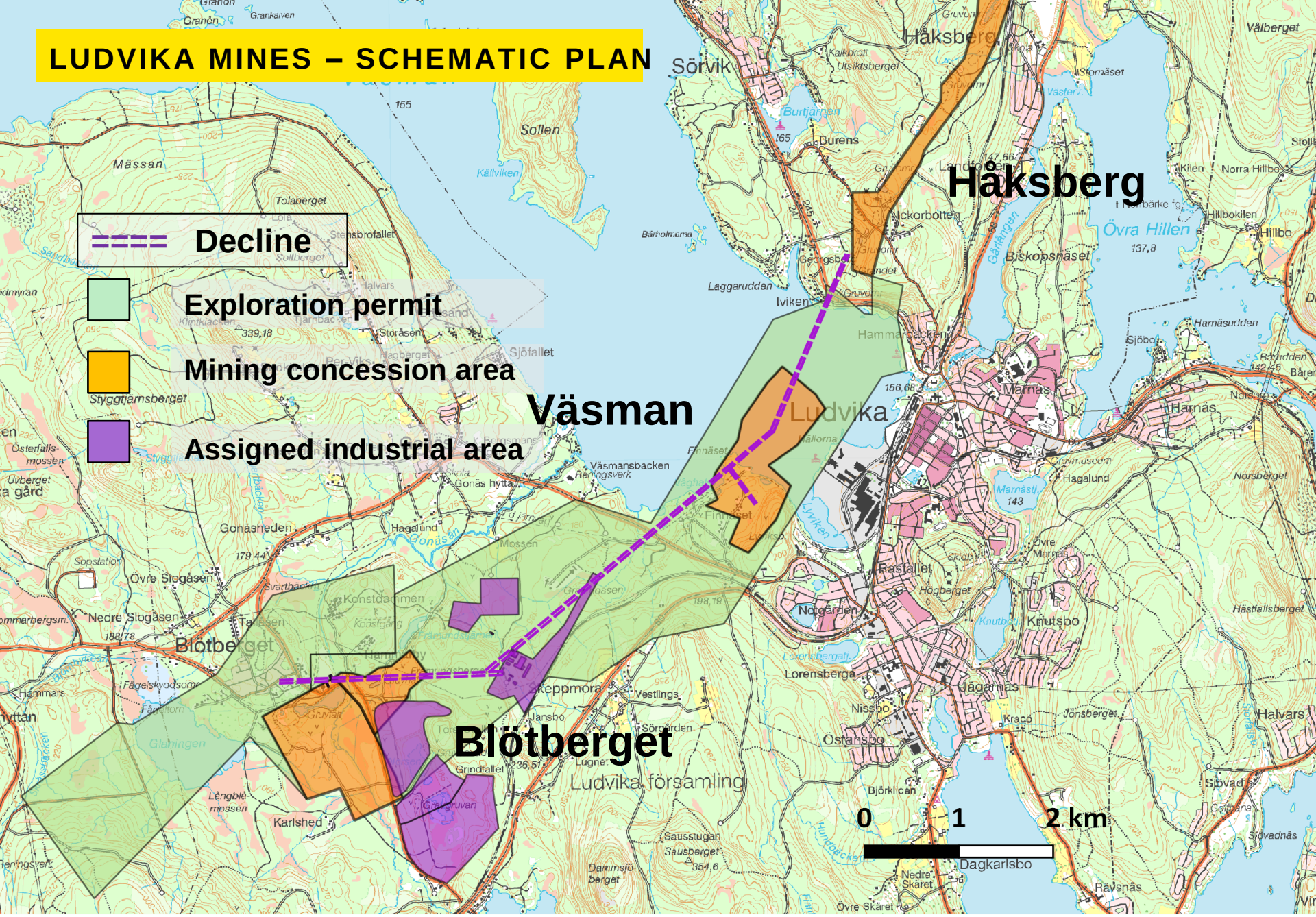
WHERE DOES NORDIC IRON ORE FIT IN TO PICTURE?

Location	Dalarnas County, southern Sweden, 215km northwest of Stockholm
History	Open pit and underground mining conducted until 1979
Resources	Total Measured + Indicated 79.8mt @ 39.6% Fe
Mining	PPCF or AVOCA/SLS
Production	Phase 1 Blötberget = >1.6mtpa / >10 year mine life (Whittle 2020) Phase 2 Väsman = ~1.6mtpa / >17 year mine life Phase 3 Håksberg = ~1.2mtpa
Product	66-71% high grade concentrate / pellet feed – suitable for DRI and hydrogen based steelmaking processes
Capex	Phase 1 = $255m (DFS estimate) Phase 2 = $180m (preliminary estimate)
Opex	Phase 1 = <$52/dt FOB (Optimisation Study calculation) Phase 2 = $55/dt FOB (preliminary estimate)
Infrastructure	Existing rail line runs from mine site to deep sea port of Oxelösund 270km away Adjacent to town of Ludvika, with plentiful access to power and skilled labour
Permitting	Environmental permit for Blötberget and Håksberg granted

LUDVIKA MINES – SCHEMATIC PLAN



BUSINESS IDEA AND STRATEGY

- **Resume operations at Ludvika Mines**
- **Low risk mine development in three phases**
- **First phase fully permitted Phase I, aiming at over 1.6 Mtpa average over LoM**
- **Low risk mine development in three phases**
- **Modern, effective and environmentally friendly sustainable mining**
- **Develop an integrated mining district of profitable mines utilising common infrastructure and existing industrial areas**
- **Niche strategy, super high grade iron ore products possible**
- **Potential to tailor make products to suite specific customers/shareholders**

WE ARE 100 % COMMITTED TO SUSTAINABLE AND GREEN MINING

High grade ore (between 66.5 and 70.5%Fe products)

- Higher iron content leads to less emissions in steelmaking

Tailings

- Inert, non toxic tailings

Underground mine

- Reduces environmental footprint

Electricfiation of asset fleet

- Secured access to clean energy

Compliant to strict regulations by Swedish authorities

- Strict Swedish legislation for environmental and worker safety

NIO aims to be compliant with ISO 14001

- Designed to minimize impact on the environment

RESEARCH PROJECTS

NIO in cooperation with academia, tech companies and the municipality

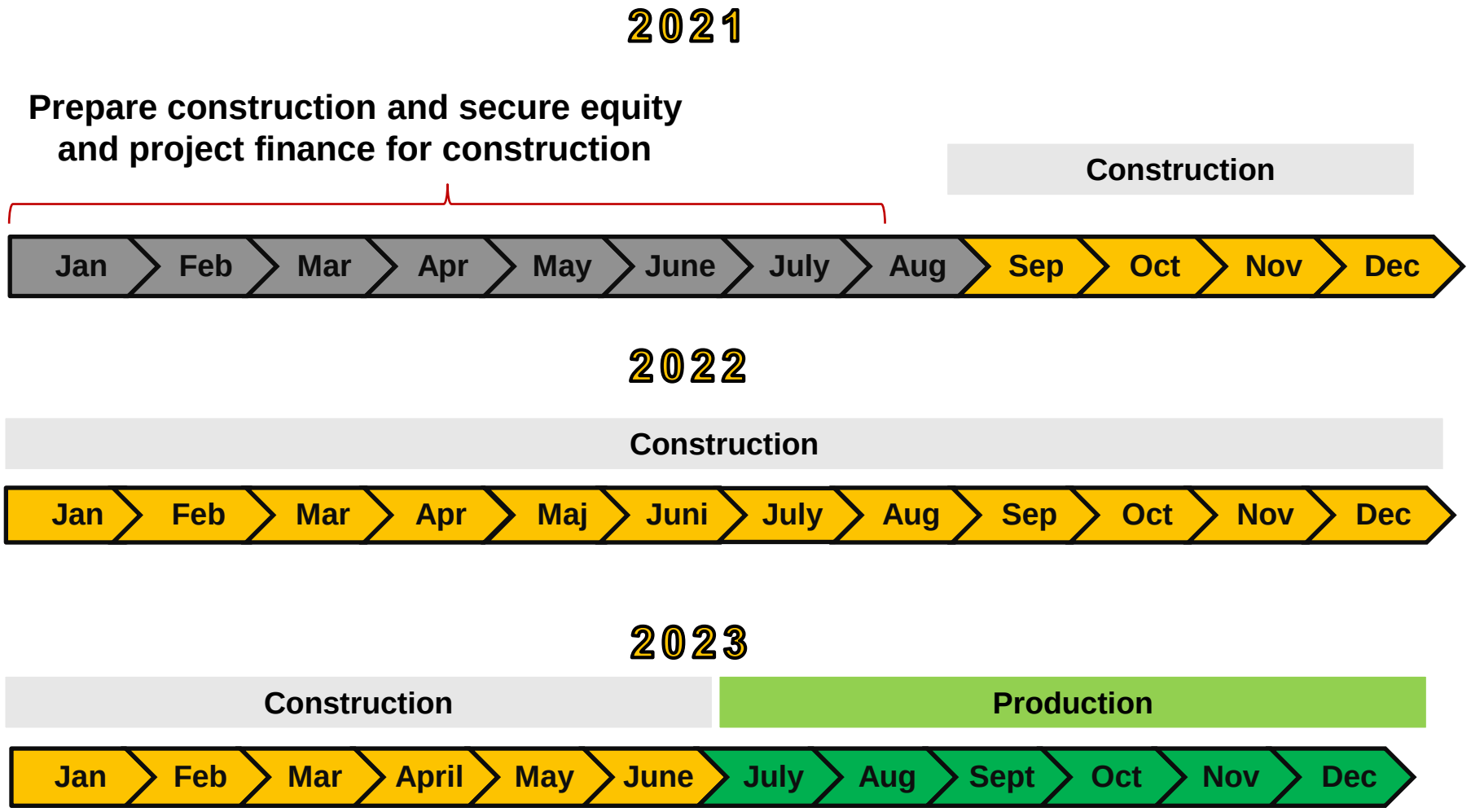
Horizon 2020 and ERA-MIN are umbrella terms for a number of research and innovation projects sponsored by the EU. The projects cover many different industries and Nordic Iron Ore is part of three projects oriented in mining exploration

The Smart Exploration project is led by Uppsala University and is sponsored by the EU. Nordic Iron Ore is part of the project as part of the partnership with 26 other participants, including Ludvika Municipality

In this project Nordic Iron Ore is managing an activity in which advanced exploration equipment and technology is demonstrated for the purpose of enhancing non intrusive, lower cost and more accurate exploration techniques

SMARTEXPLORATION
new ways to explore the subsurface

IMPLEMENTATION TIME PLAN 2021–2023



MANAGEMENT TEAM

Broad mix of skills, knowledge and experience

LENNART ELIASSON
Managing Director

- CFO of Nordic Iron Ore 2011-2018
- KPMG
- Swedbank Corporate Finance

Over 30 years in financial advisory before joining NIO

MARKUS KARLSSON
Project Director

- LKAB
- Northern Iron
- Arcelor Mittal
- Northland Resources
- Newcrest Mining Ltd

25 years experience in mine developments and operations

HANS THORSHAG
Technical Director

- LKAB
- Boliden
- Midroc Gold
- Lundin Mining

Over 40 years experience in mine developments around the world

PAUL MARSDEN
Technical Sales and Marketing Advisor

- British Steel & Corus Consulting
- Northland Resources
- Kogi Iron

Over 40 years experience in iron ore mine and steel industry developments

WHY INVEST IN NORDIC IRON ORE?

- DFS and optimisation study show **good commercial potential**
- Very **low execution risk** due to:
  - ✓ All necessary permits in place
  - ✓ Effective logistics solution
  - ✓ Brownfield project with important infrastructure available
  - ✓ Strong market demand forecasts for quality iron ores
- An **environmentally friendly** mine with a product contributing to reduced environmental impact from steel production.
- **High grade** iron ore products are increasingly in strong demand, receiving premium prices & suitable for the “carbonless steelmaking” processes
- **Scalability**: An exciting large expansion potential at Väsman, with synergies
- Will be built using the **latest high standards** and levels of **automation** already proven at efficient European mining operations