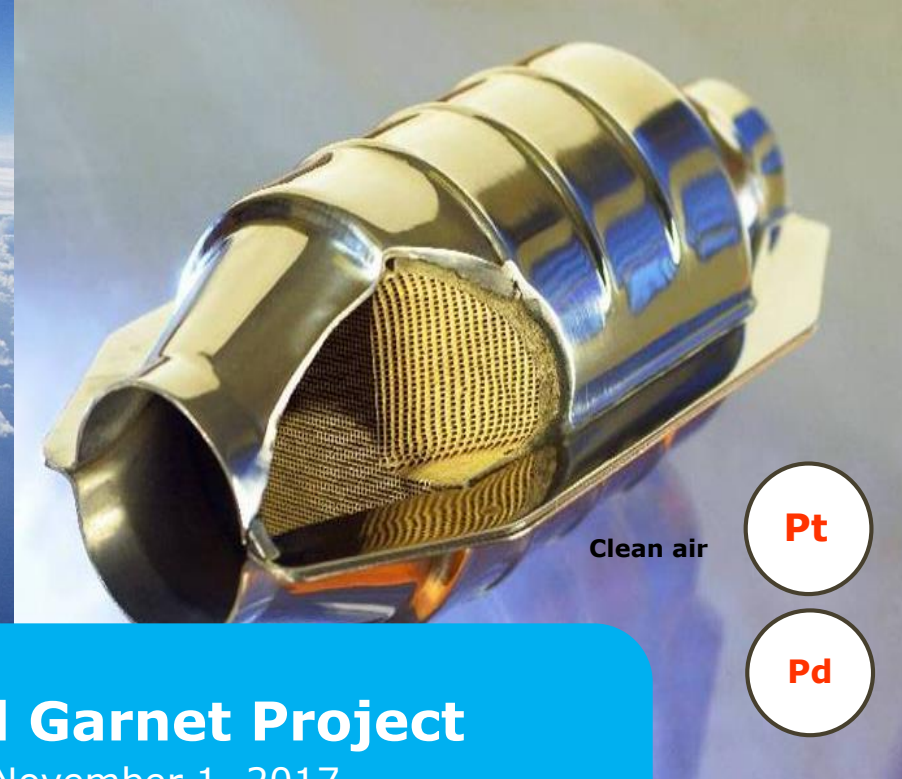




Lighter aircrafts



Clean air



Engerbø Rutile and Garnet Project

CEO Ivar S. Fossum, November 1, 2017

MINERALS FOR A SUSTAINABLE FUTURE
OAX: NOM



Renewable energy



Electric cars

Disclaimer

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Developing high-value assets in the Nordic Region



Engerbø Rutile and Garnet (100%)



High Purity Quartz



Seabed minerals



Platinum, Palladium

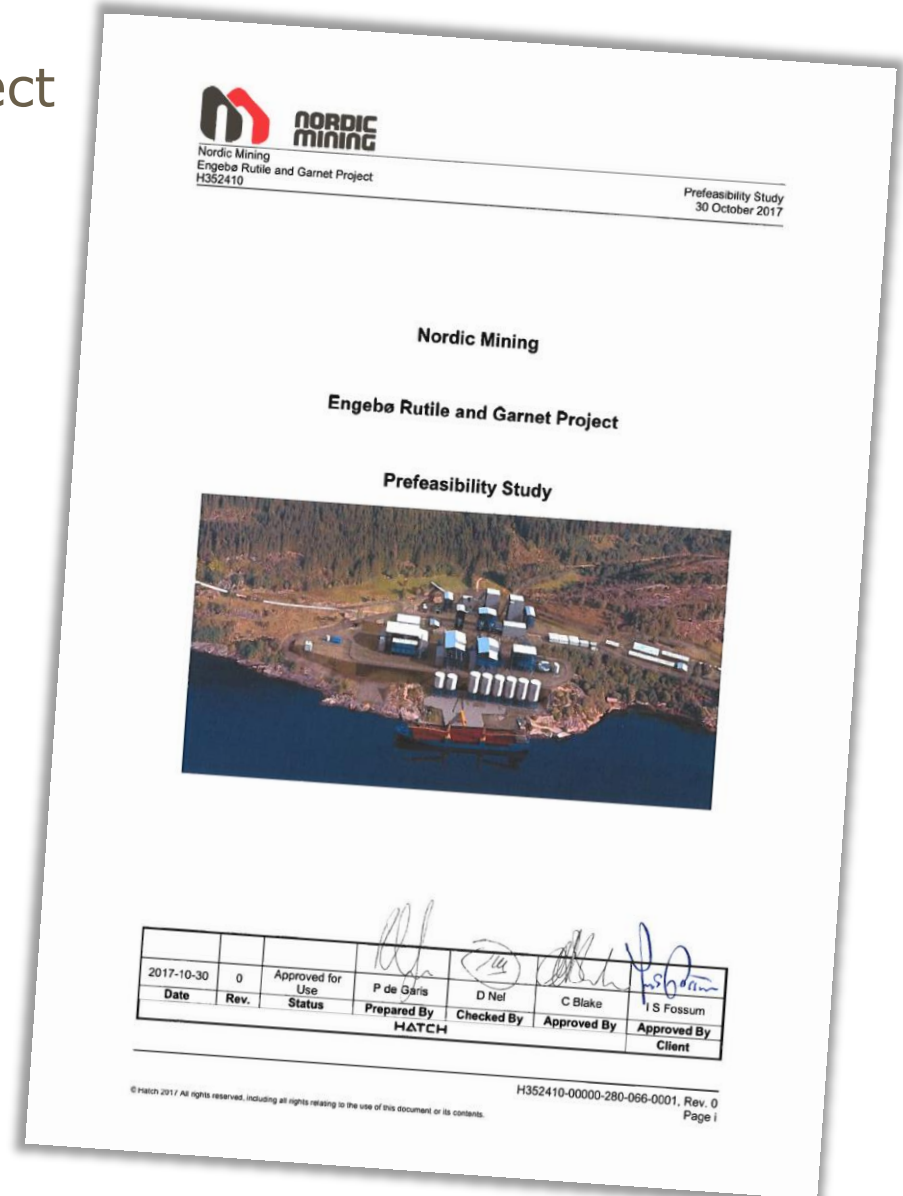


**Keliber Oy
Lithium (22%)**

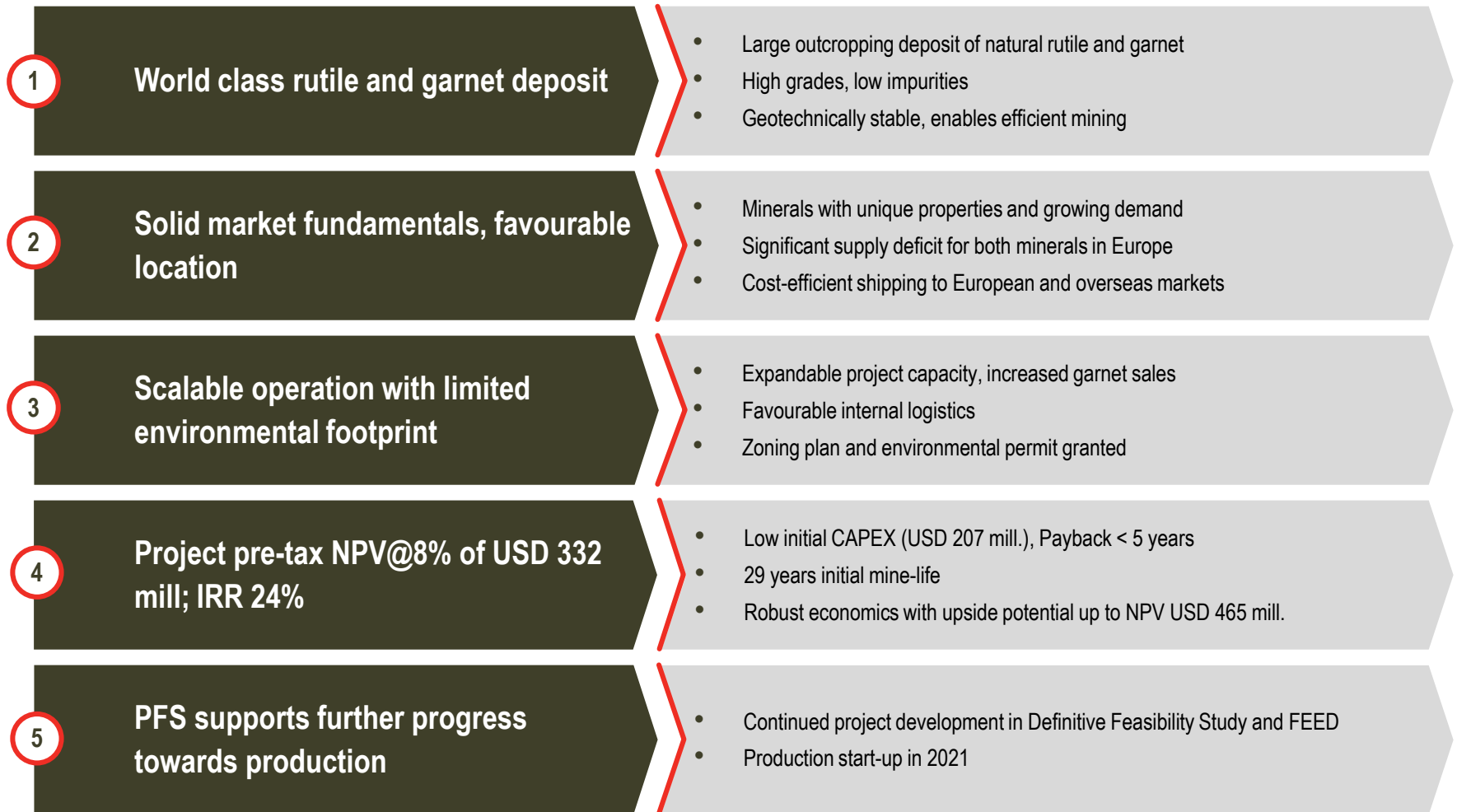


Engerbø Rutile and Garnet Project Prefeasibility Study

- ✓ Published on October 30, 2017
- ✓ Full report available on company website
- ✓ www.nordicmining.com



Summary of the Engebø Prefeasibility Study (PFS)



1

World class rutile and garnet deposit

2

Solid market fundamentals, favourable location

3

Scalable operation with limited environmental footprint

4

Project pre-tax NPV8% of USD 332 mill; IRR 24%

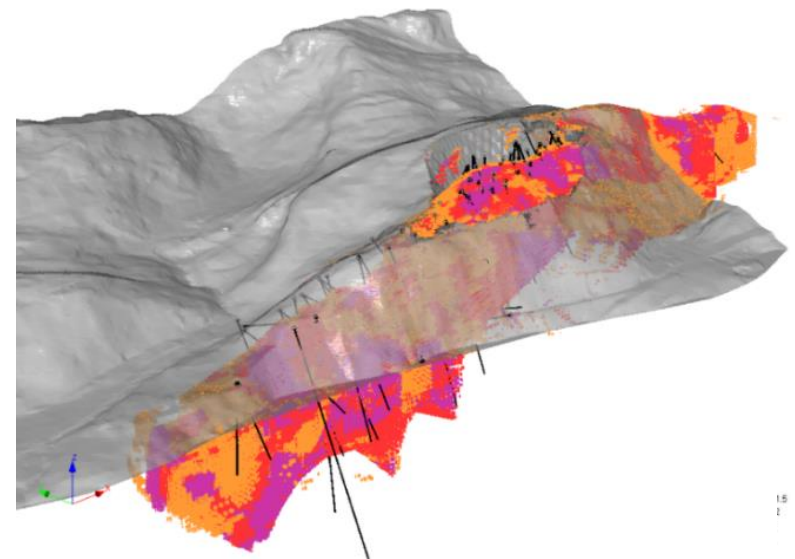
5

PFS supports further progress towards production



Large eclogite deposit located at tidal waters

- ✓ Outcropping deposit with unknown extension to depth
- ✓ Geotechnically stable orebody allows for effective mining
- ✓ Low impurities, negligible content of heavy metals and radioactive elements
- ✓ Easy transition from open pit to underground mining



15



High grade rutile and garnet mineralisation

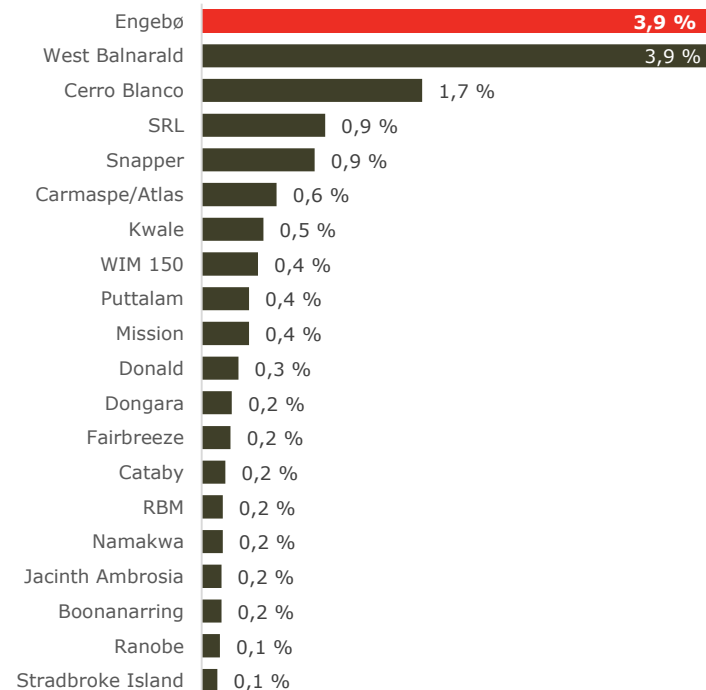
Mineral resource classification*

- ✓ The mineral resource is defined with 3% cut-off
- ✓ Increased cut-off implies stronger financial performance in early mining years
- ✓ Large potential in inferred resources

	3% cut-off grade		
	Tonnage Mt	TiO ₂ %	Garnet %
Measured	15	3.97%	44.6%
Indicated	78	3.87%	43.6%
Measured & indicated	93	3.89%	43.7%
Inferred	138	3.86%	43.5%

Among the highest rutile grades

- ✓ Rutile grade for current producers and planned projects



* Resource estimates completed by Competent Person Adam Wheeler, corresponding to the guidelines of the JORC Code (2012 edition).



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Rutile and Garnet - unique mineral properties, increasing demand

Garnet

Current world production: ~ 1.4 million tonnes



WATERJET CUTTING



SAND BLASTING



ABRASIVES



Tests have demonstrated that Engebø can produce coarse and fine garnet suitable for a broad range of applications

Rutile

Current world production: ~ 0.8 million tonnes



PIGMENT



WELDING RODS



TITANIUM



Tests have demonstrated that Engebø can produce 95% TiO₂ rutile suitable for pigment and titanium metal

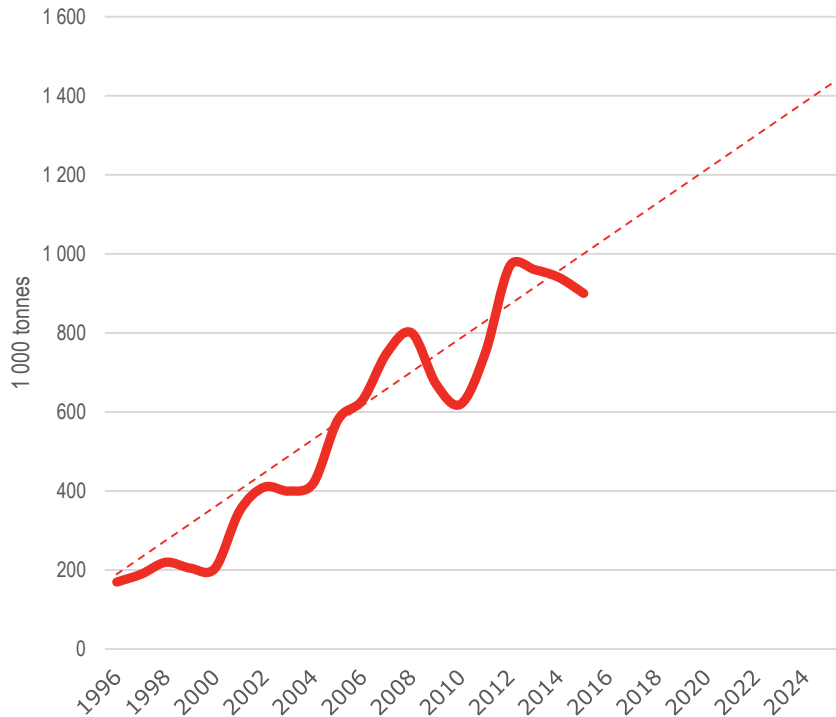


Titanium dioxide – a part of everyday life

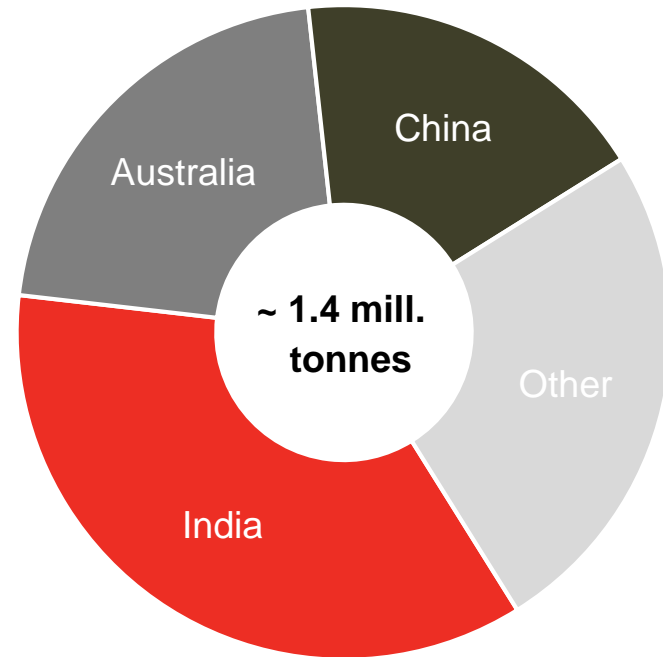


Garnet - young mineral with strong growth

Apparent consumption of garnet (excl. China)*



Current world production*

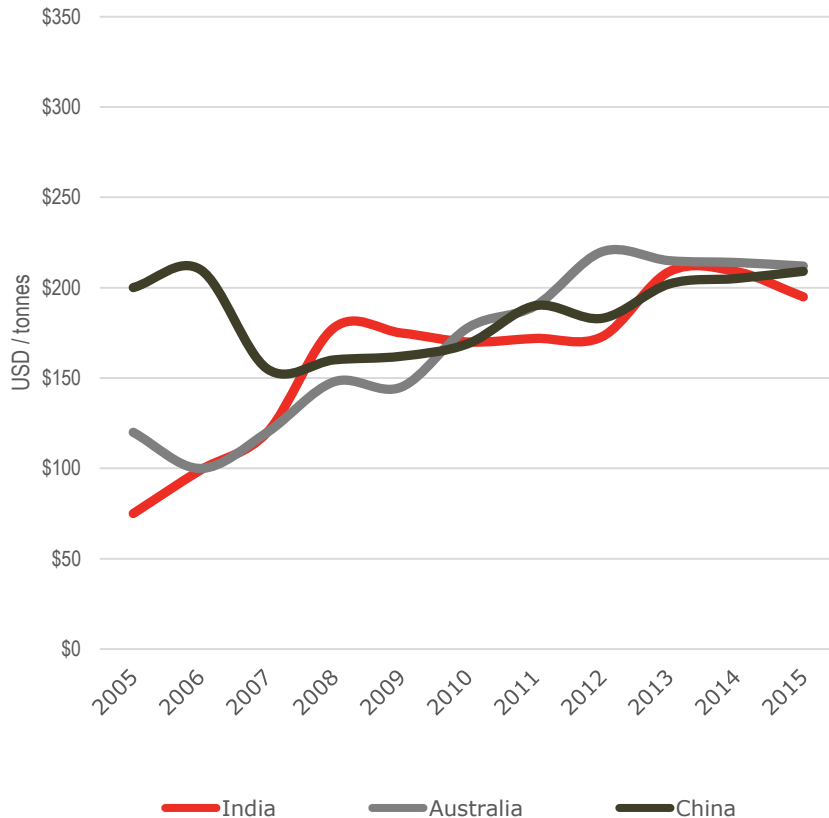


* Source: TAK Industrial Mineral Consultancy



Garnet market and price forecast

Average garnet export prices (FOB)*



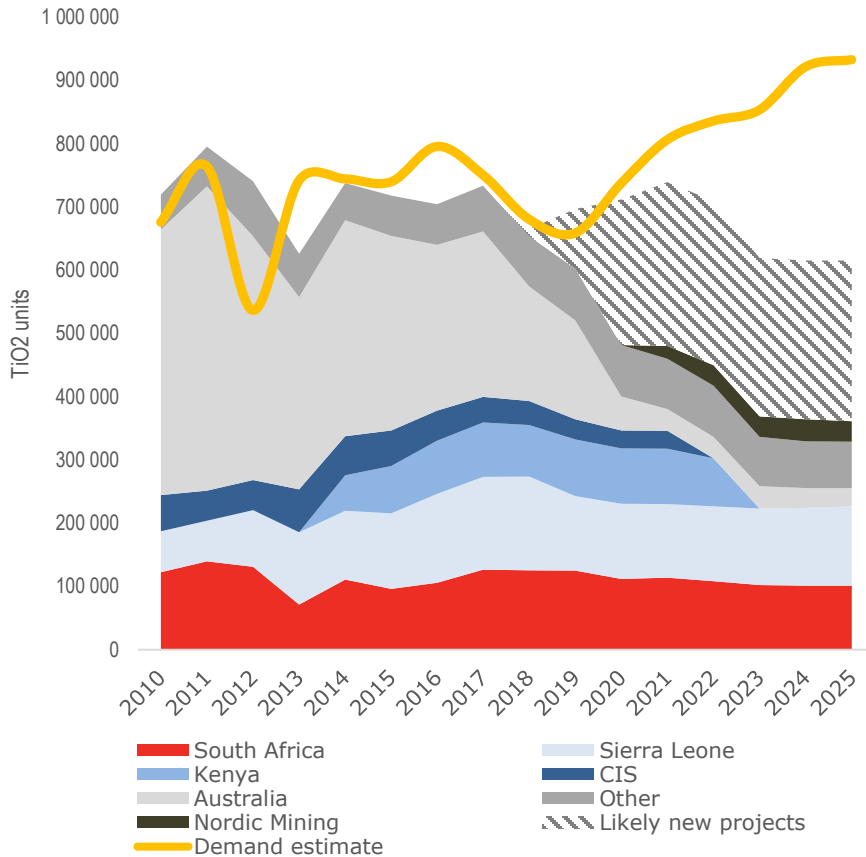
- ✓ Emerging mineral with strong growth in the waterjet cutting markets
- ✓ Currently no European production
- ✓ Engebø is one of few hard rock deposits of almandine garnet
- ✓ Engebø will produce commercial end-products:
 - 80 mesh waterjet
 - 100 mesh waterjet
 - 30/60 mesh blast market
- ✓ PFS garnet price assumption of USD 250/tonne in real terms based on a basket of the three products

* Source: TAK Industrial Mineral Consultancy

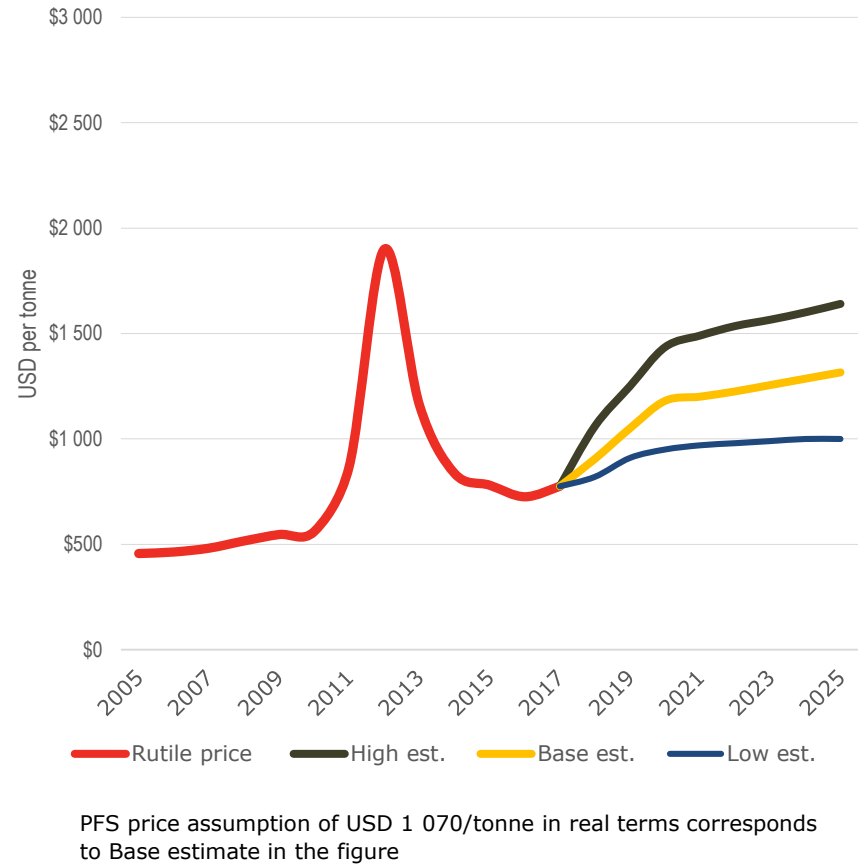


Rutile market and price forecast

Global rutile supply/demand balance*



Rutile price forecast*



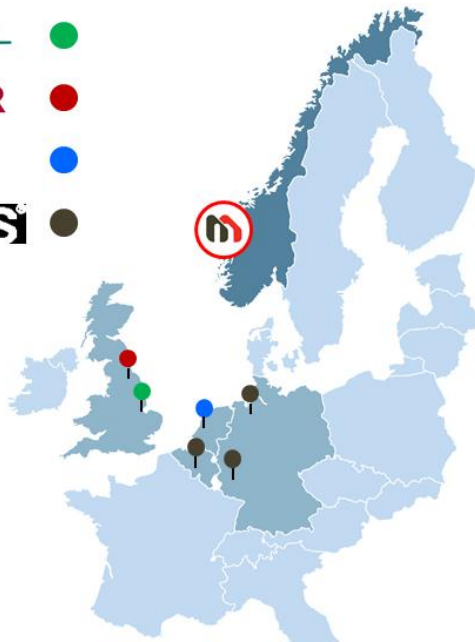
* Source: TZMI



Export sales from Engebø

Rutile off-take

- ✓ The largest pigment manufacturers in Europe with chloride technology have a total production capacity above 500,000 tonnes per annum
- ✓ Several can consume Engebø's annual volume
- ✓ Plant-to-plant shipment
- ✓ Logistical and freight cost advantages



Garnet off-take

- ✓ Nordic Mining has signed a MoU with a leading, international producer of industrial minerals
- ✓ The parties intend to establish long-term cooperation within development, production, sales, marketing and distribution of garnet products from Engebø



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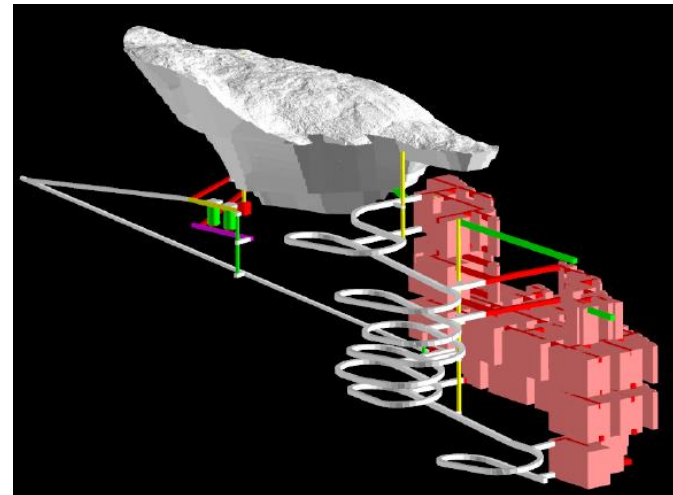
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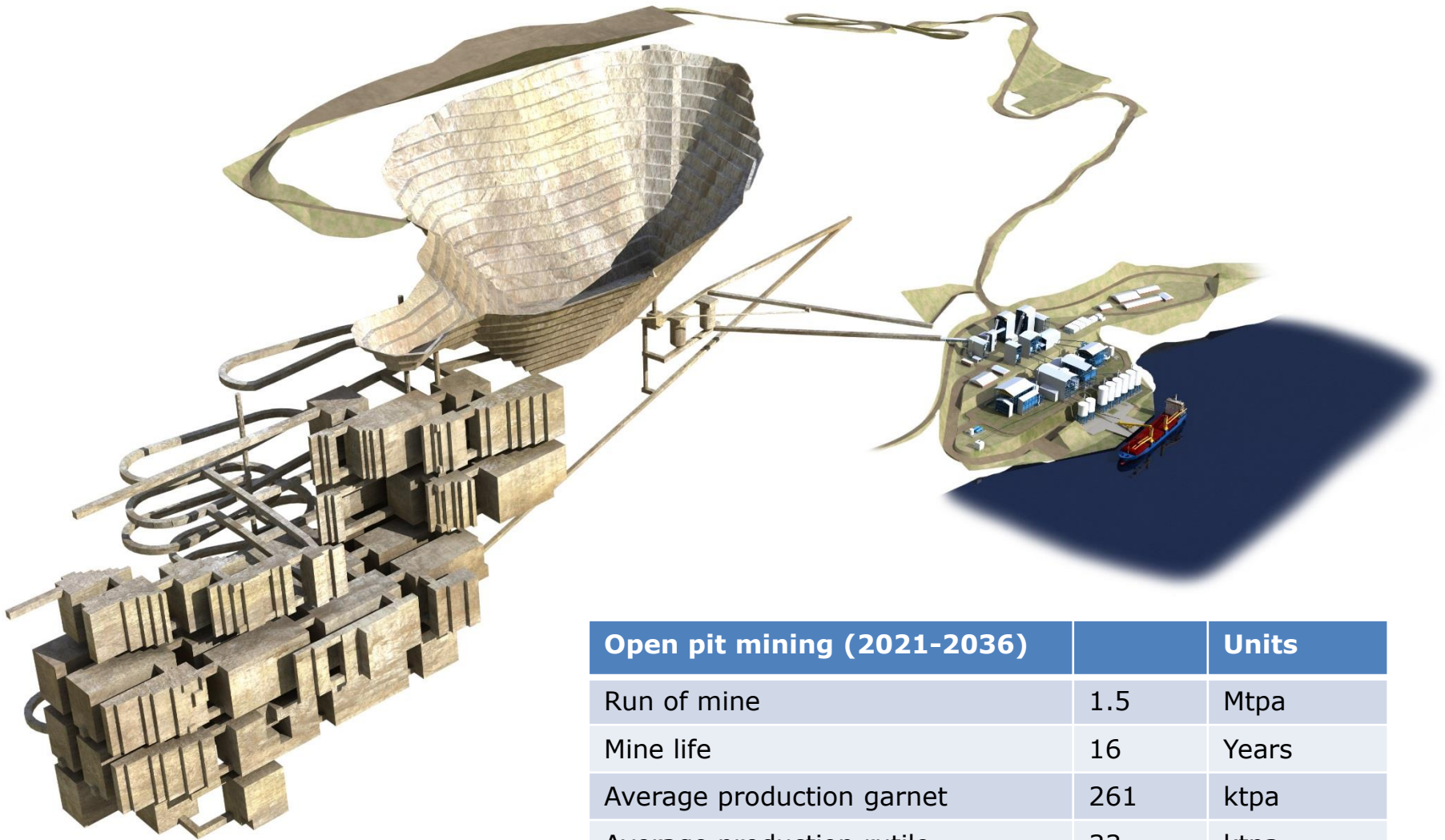
PFS supports further progress towards production



Favourable internal logistics, short haulage distance

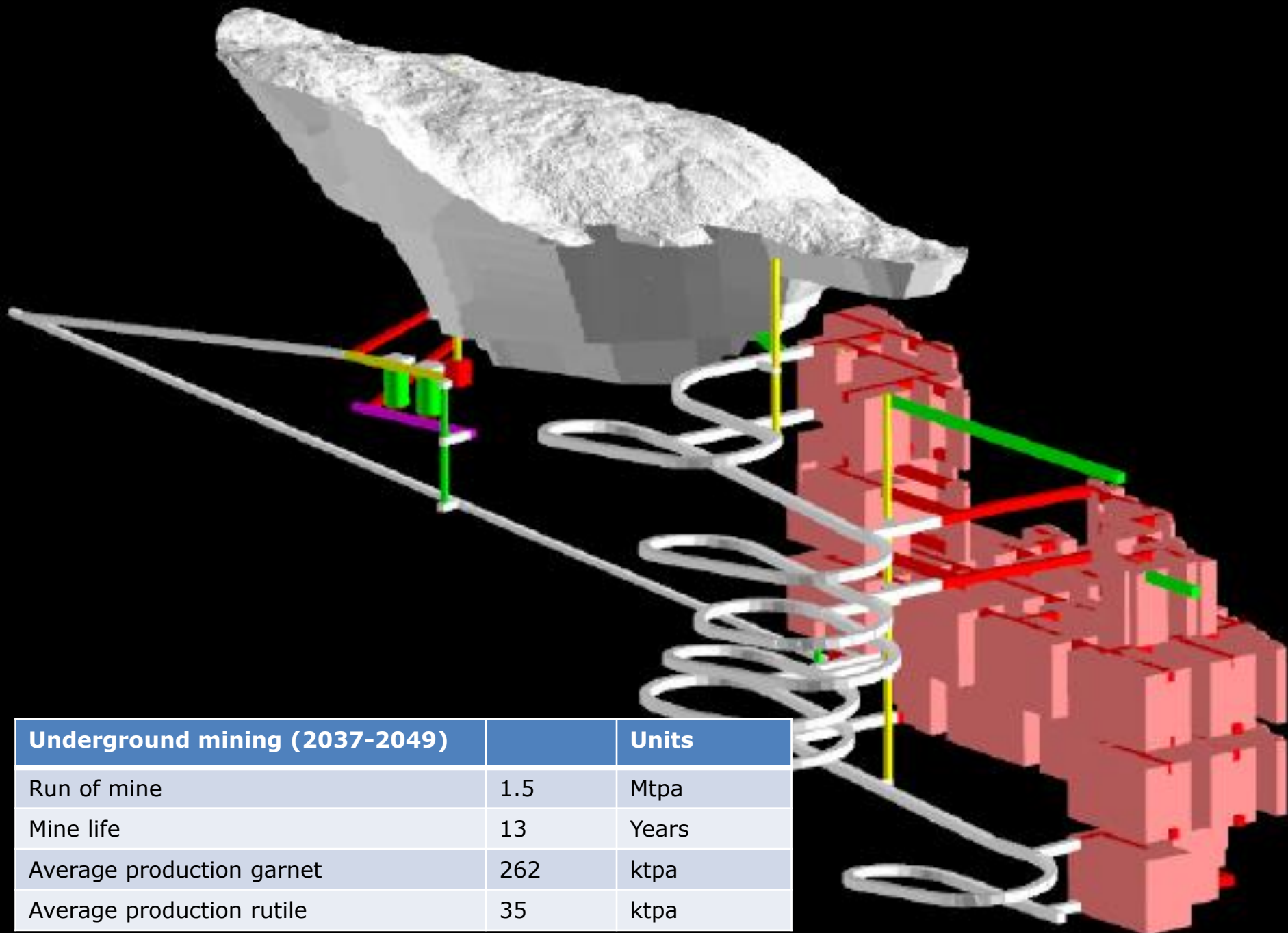
- ✓ 16 years open pit mining
- ✓ Rich ore in the early years
- ✓ Low stripping ratio
- ✓ Glory hole concept with underground crushing facility and ore silos
- ✓ Limited visual impact
- ✓ Open pit gives easy access to underground ore
- ✓ Permit allows for future expansion





Open pit mining (2021-2036)		Units
Run of mine	1.5	Mtpa
Mine life	16	Years
Average production garnet	261	ktpa
Average production rutile	33	ktpa
Strip ratio	1.34	Waste/ore





Underground mining (2037-2049)		Units
Run of mine	1.5	Mtpa
Mine life	13	Years
Average production garnet	262	ktpa
Average production rutile	35	ktpa

PFS process testwork; industrial scale equipment

- ✓ Comprehensive testwork has documented commercial products from rutile and garnet according to market specifications
- ✓ Testwork has demonstrated rutile recovery of approximately 60%



HATCH

ihc ROBBINS

JKtech
SMI
Technology Transfer

SGS


MINTEK

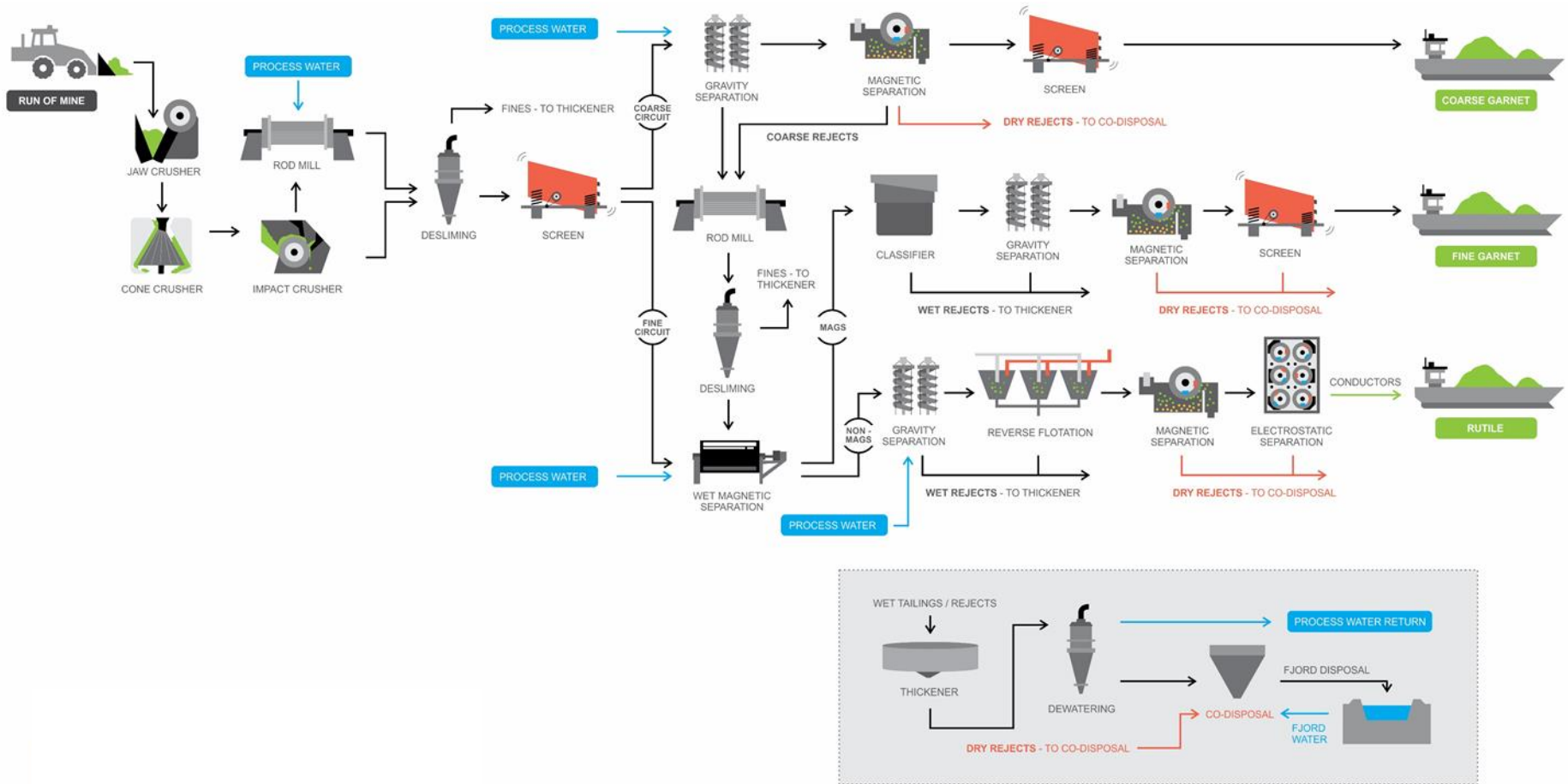
IMSV
ENGINEERING

CORE 

 **Mineral
Technologies**
A Downer Company

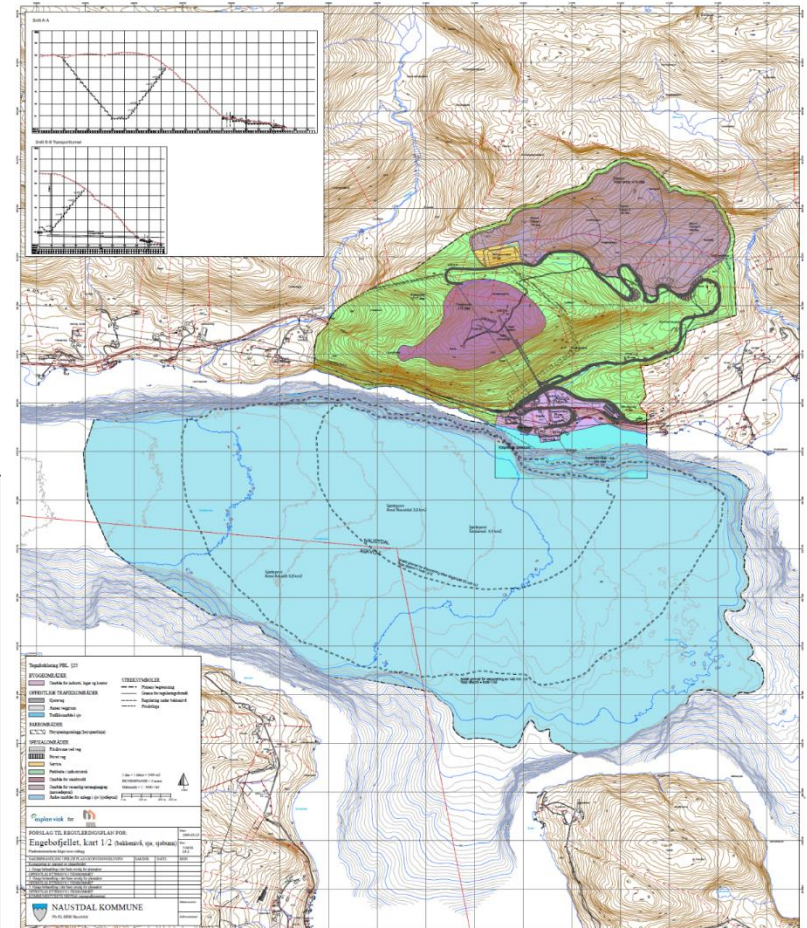
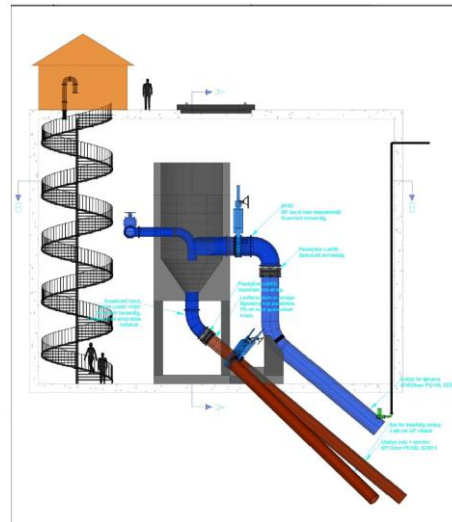
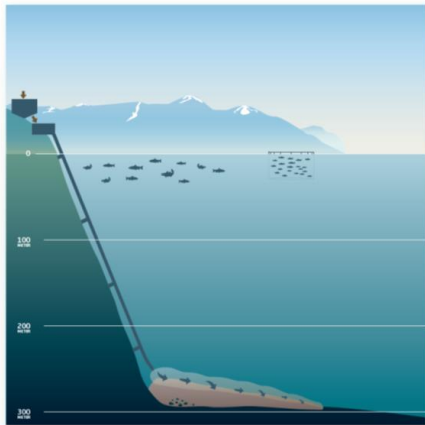


Flowsheet of rutile and garnet process



Zoning plan and environmental permits fully granted

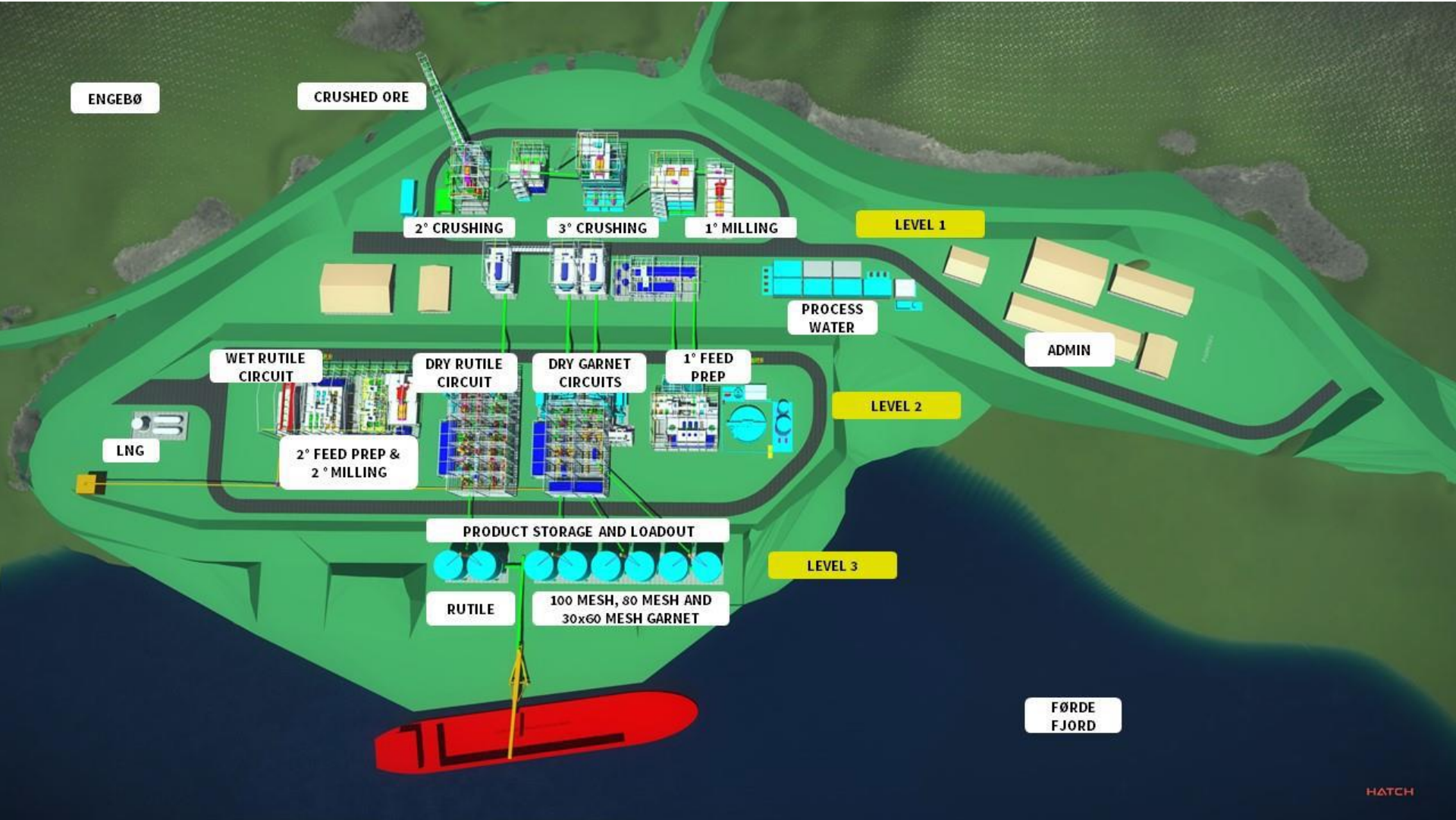
- ✓ Deep-sea disposal offers safe and sustainable tailings solution
- ✓ The tailings will mainly sediment within the regulated area
- ✓ The currents in the tailings area are moderate and there is limited risk for erosion currents
- ✓ Continuous monitoring of the sea disposal will be implemented



A three dimensional, dynamic discharge permit



Compact process plant, including ship-loading facilities



HATCH



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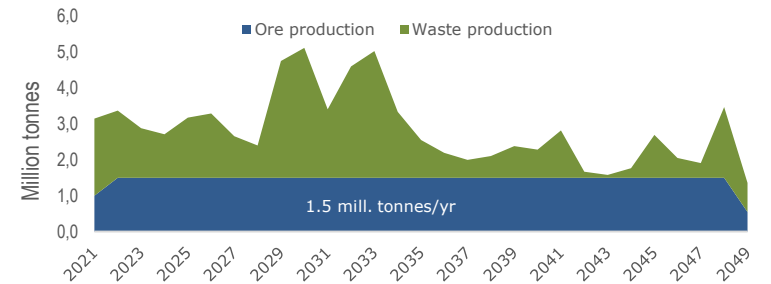
PFS supports further progress towards production



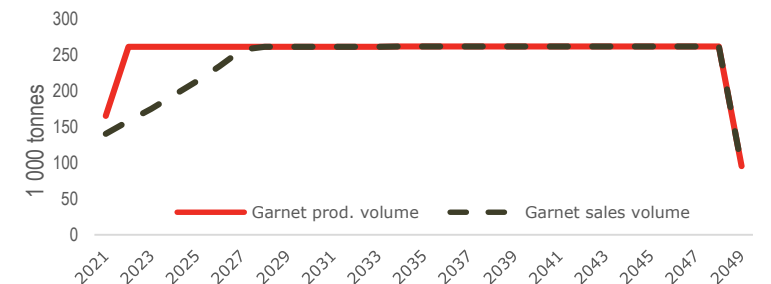
Key project assumptions

Assumptions	Value
Garnet price	USD 250/tonne
Rutile price	USD 1 070/tonne
Garnet sales (from ~2027)	261 000 tpa
Rutile sales (average)	32 500 tpa
Opex per sales tonne ¹⁾	USD 87 per tonne
Capex 2019-2021	USD 207 mill.
Open pit mining and comminution	26.8
Mineral processing and tailings handling	68.6
Infrastructure, storage and loadout	35.7
Indirects	41.8
20% contingency	34.2
Deferred capex 2033	USD 17 mill.
Underground mining and comminution	10.8
Indirects	2.7
25% contingency	3.4

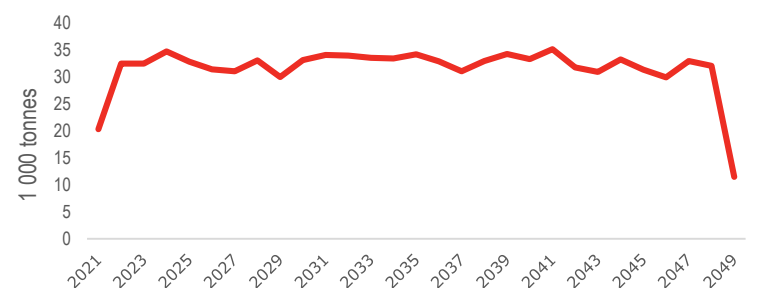
Mining production



Garnet sales and production volume



Rutile sales and production volume

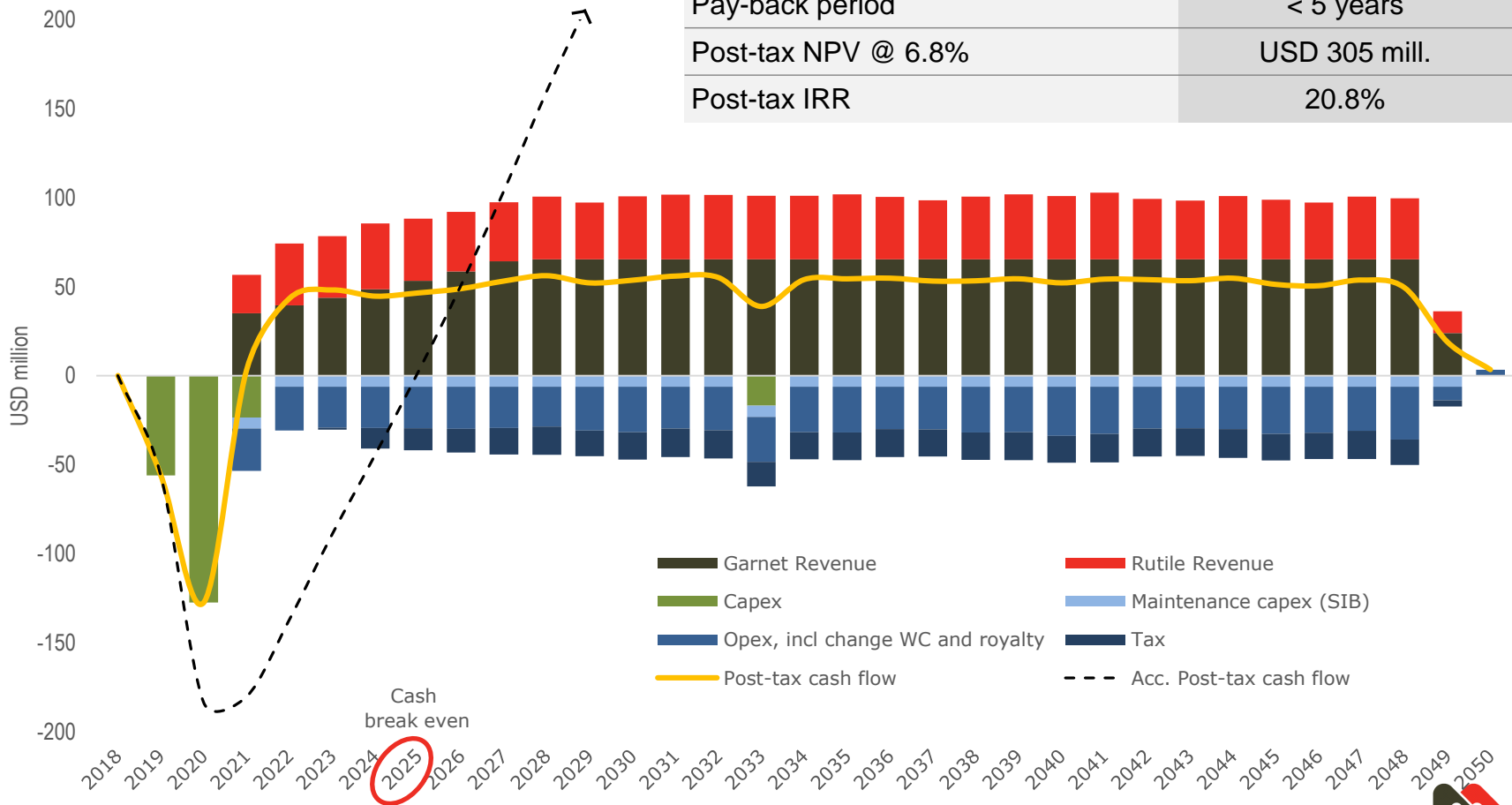


1) Based on total sales volume for rutile and garnet



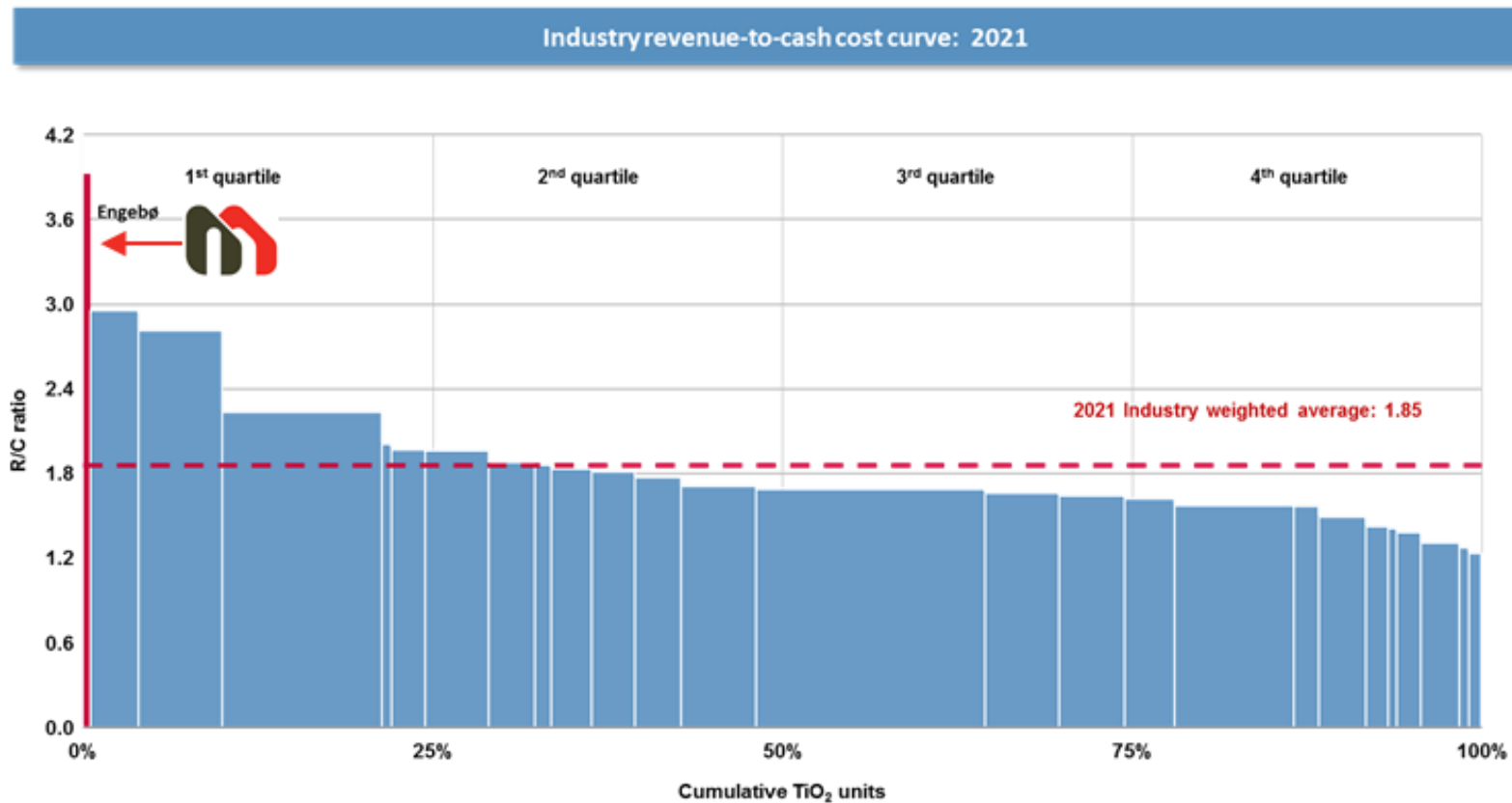
Attractive project economics

Metric	Value
Pre-tax NPV @ 8%	USD 332 mill.
Pre-tax IRR	23.8%
Life of mine	29 years
Pay-back period	< 5 years
Post-tax NPV @ 6.8%	USD 305 mill.
Post-tax IRR	20.8%



Competitive rutile revenue-to-cash cost position

- ✓ The revenue-to-cash cost ratio is based on the first ten years of operations
- ✓ Engebø benefits from producing two high value products with low mining and processing costs

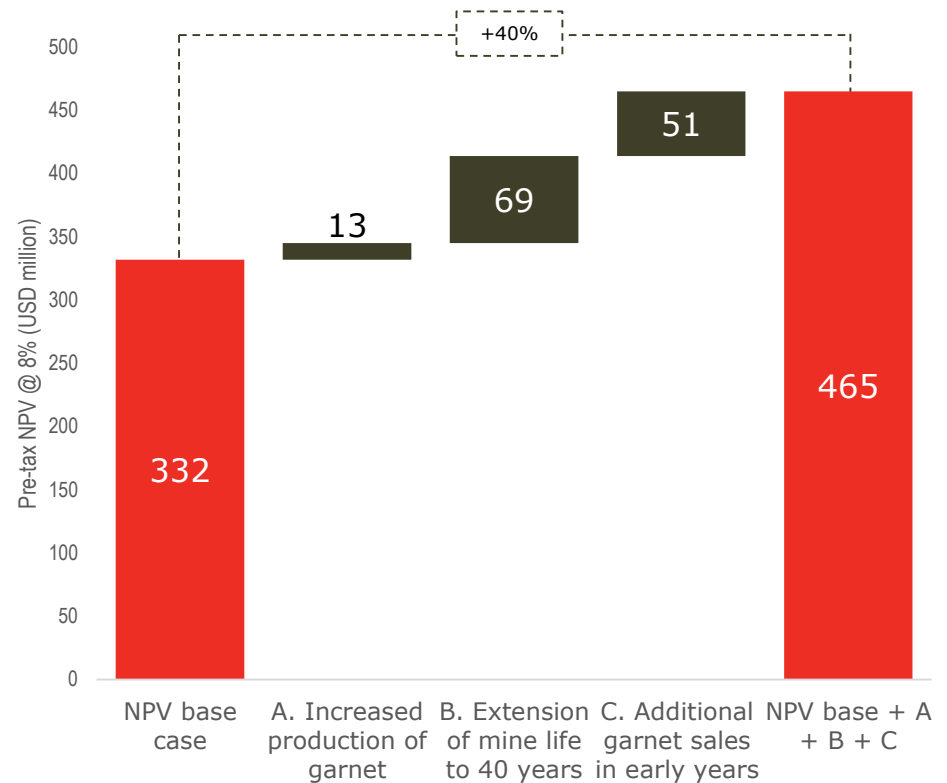


Source: TZMI



Large upside potential

- A.** Increased production of garnet to 300 000 tonnes/year
- B.** Extension of mine life to 40 years by including Inferred Resources
- C.** Additional garnet sales in early years





HATCH

+

Together we can build positive change

+

A grid of small plus signs is visible at the bottom of the banner.

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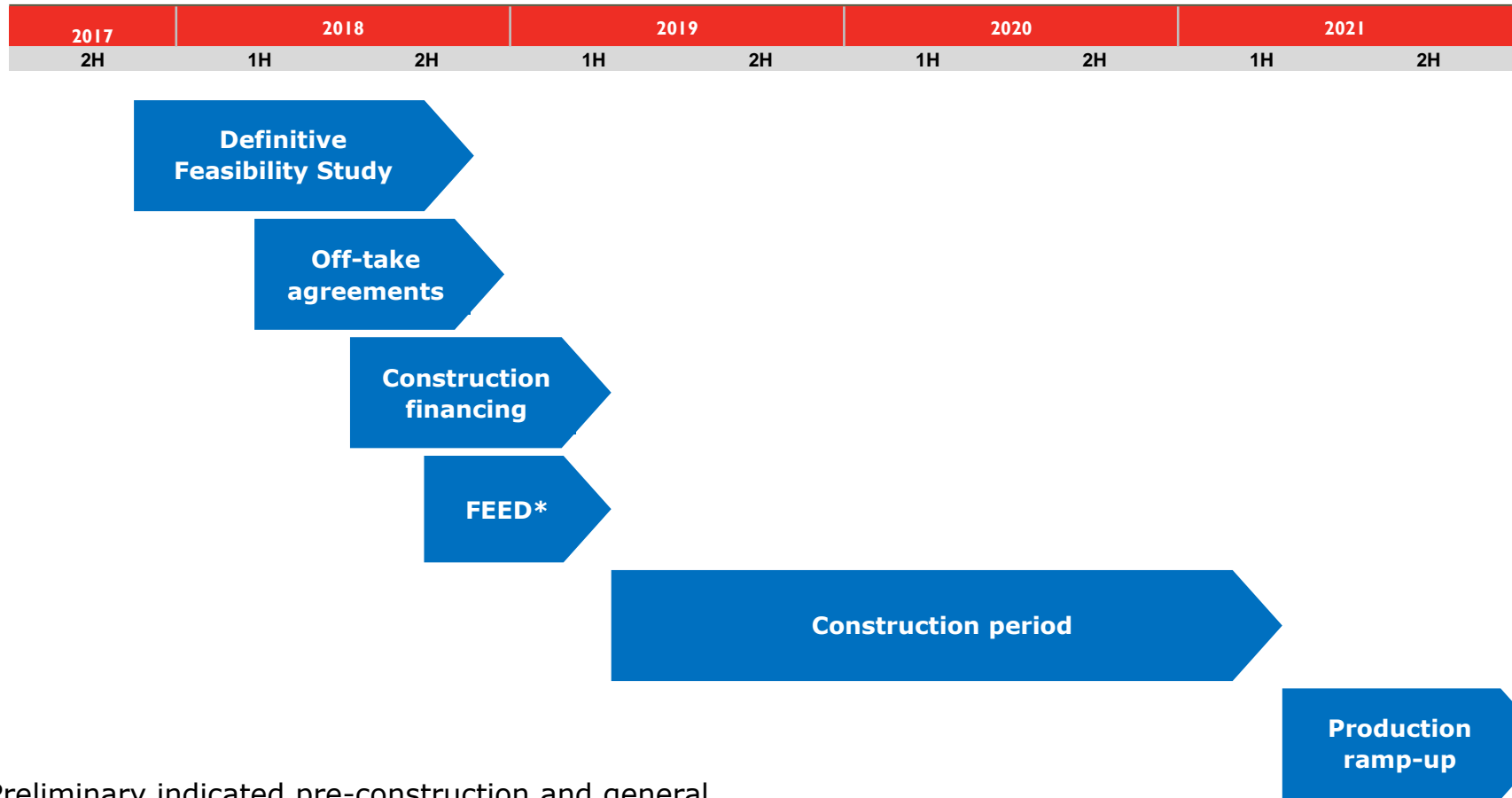
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The way forward



Preliminary indicated pre-construction and general corporate expenditures of approx. USD 20 million

* FEED: Front End Engineering & Design



Definitive Feasibility Study (DFS) targets project bankability

- ✓ Mining trade-off studies, mine design and schedule
- ✓ Mineral processing testwork, ore variability and flowsheet optimisation
- ✓ Modularisation and logistical studies
- ✓ Procurement strategy and procurement operating plan
- ✓ Multi-disciplinary design and engineering work
- ✓ Development of Project Execution Plan(PEP) and Construction Schedule
- ✓ QRA
- ✓ Building “Owners team” including local project team
- ✓ Cooperation and anchoring with local society



Promising results from the Prefeasibility study



- ✓ Robust dual-mine operation with high-quality garnet and rutile
- ✓ Low investments
- ✓ Attractive project economics

THANK YOU!

Safety – Environment - Innovation



**NORDIC
MINING**

www.nordicmining.com