

#### Company presentation

January 2016









Exploration and production of high-end minerals and metals

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# Minerals for a sustainable future Platinum, Palladium Titanium - natural rutile High Purity Quartz Lithium Seabed minerals exploration Developing high-value assets in the Nordic Region





## Shareholder structure and share price development

#### Largest shareholders\*

	Name of shareholder	No. of shares	%
1	NORDNET BANK AB (NOMINEE)	29 795 240	7,7 %
2	SKAGEN VEKST	18 416 432	4,8 %
3	NORDEA BANK PLC FINL. CLIENTS ACC. (NOMINEE)	14 510 733	3,8 %
4	NORDNET LIVSFORSIKRING	11 665 687	3,0 %
5	DYBVAD CONSULTING AS	10 011 148	2,6 %
6	DANSKE BANK A/S (NOMINEE)	7 070 466	1,8 %
7	OVE KLUNGLAND HOLDIN NIL	7 023 696	1,8 %
8	MAGIL AS	6 500 000	1,7 %
9	SNATI AS	6 000 000	1,6 %
10	CITIBANK N.A. S/A POHJOLA BANK PLC (NOMINEE)	5 613 620	1,5 %
11	INFOSAVE AS	5 144 863	1,3 %
12	LITHION AS	4 167 898	1,1 %
13	OLE KRISTIAN G. STOKKEN	3 736 721	1,0 %
14	AUDSTEIN DYBVAD	3 356 000	0,9 %
15	FEMCON AS	3 080 316	0,8 %
16	ADURNA INVEST AS	3 079 993	0,8 %
17	REIDAR JARL HANSEN	3 018 124	0,8 %
18	OLAV BIRGER SLETTEN	2 680 000	0,7 %
19	JON HOVDEN	2 550 000	0,7 %
20	VPF NORDEA AVKASTNING C/O JP MORGAN EUROPE	2 524 134	0,7 %
	Top 20 shareholders	149 945 071	38,9 %
	Others	235 559 734	61,1 %
	Total	385 504 805	100,0 %

#### Share overview and share price development\*

#### Share overview

NOM
Oslo Axess
385 504 805
82%
18%
2.5%
10 750 000
9 500 000
396 254 805
0,63
243
0.40 - 1.28





## Board of Directors and Management

#### **Board of Directors**



Tarmo Tuominen, Chairman Chief Supply Chain Officer in Nordkalk, Finland. Geologist with broad mining experience



**Kjell Roland, Deputy chairman** CEO of Norfund, Norway



Mari Thjømøe, Board member Extensive executive and board experience from oil and gas, finance and investment management (e.g. Statoil, Hydro and KLP)



Hilde Myrberg, Board member Extensive executive and board experience from oil and gas, power and consumer industries (e.g. Hydro and Orkla)



**Tore Viana-Rønningen, Board member** VP in Dag Dvergsten AS, Norway. Previous experience from Barclays Natural Resource Investments

#### Management



Ivar S. Fossum, CEO 20 years experience from management positions in Hydro (oil/gas and fertilizers) and FMC Technologies



Lars K. Grøndahl, CFO More than 20 years experience from industrial management positions in i.a. Aker, Scancem Group and HeidelbergCement

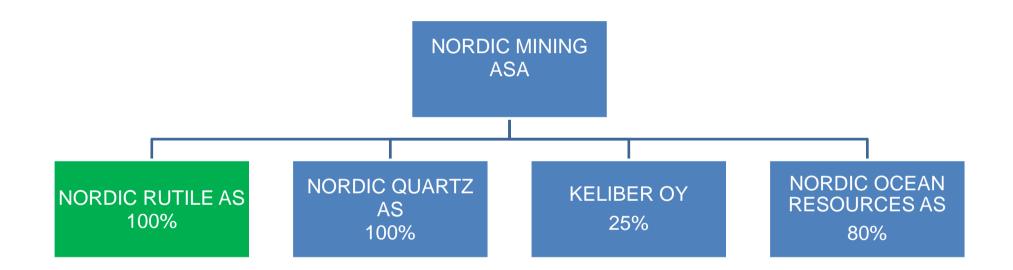


Mona Schanche, Exploration Manager Resource geologist from the University of Science and Technology in Trondheim. Previous experience as project geologist in Titania (Kronos Group)

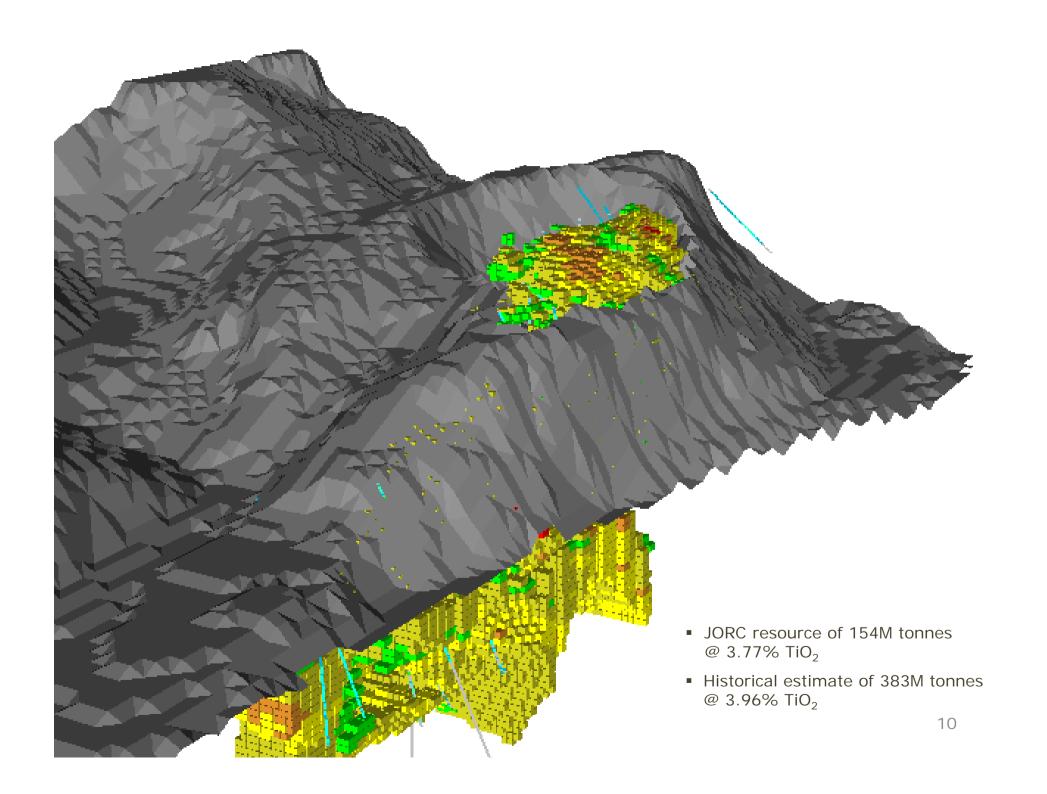
Thomas B. Addison, MD Nordic Rutile AS
Mining engineer from the University of Science
and Technology in Trondheim. Broad experience
from Franzefoss Minerals, Sibelco, and SNSK.



## Nordic Mining Group



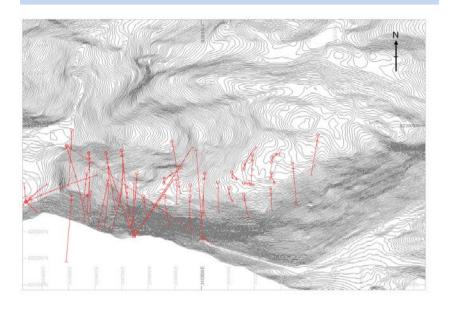






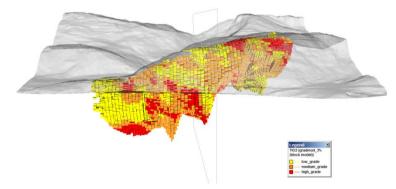
## Well-defined deposit

#### Total of 50 exploration drill holes



#### JORC Resource\*

Resource class JORC	Mill tonnes	TiO <sub>2</sub> % @ 3% cut-off
Indicated	31.7	3.77
Inferred	122.6	3.75
Total	154.3	3.77



- 50 drill holes (15,000 meters)
- 1,129 surface samples
- > 50 000 TiO2 analysis
- Block model ordinary kriging

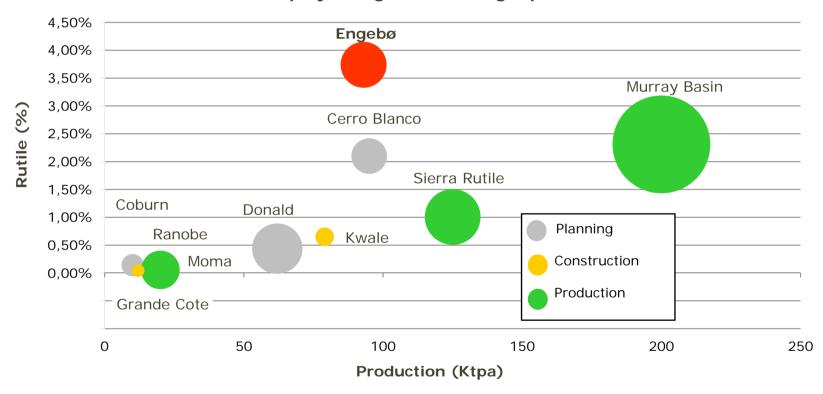
- Planned drilling program of approx. 6,500 meters
- Open pit mining for 10 15 years,
   35 40 years underground mining
- Open pit strip ratio of 0.45:1 (waste/ore)



Considerable JORC compliant resource estimate with upside potential from additional drilling

## Engebø is among the largest rutile deposits in the world

#### Rutile projects' grade and target production

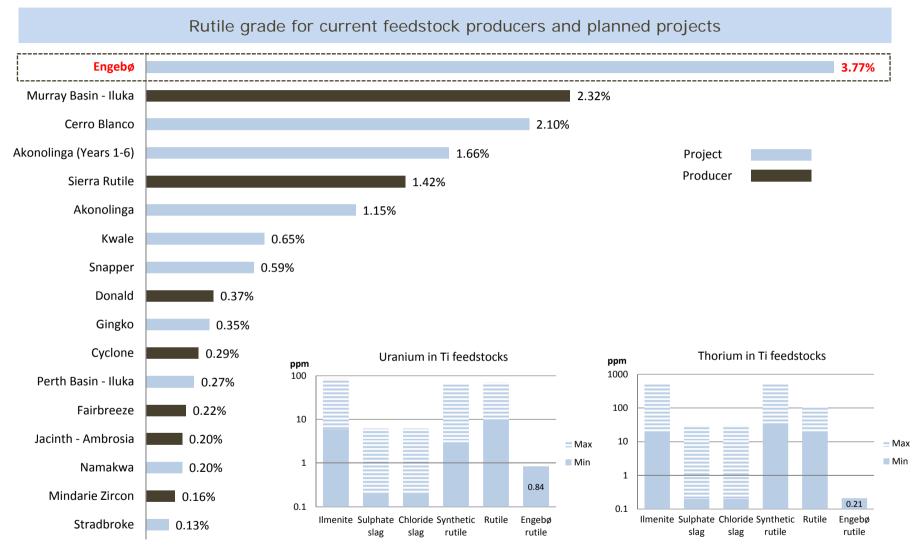


Size of bubble indicates resource size



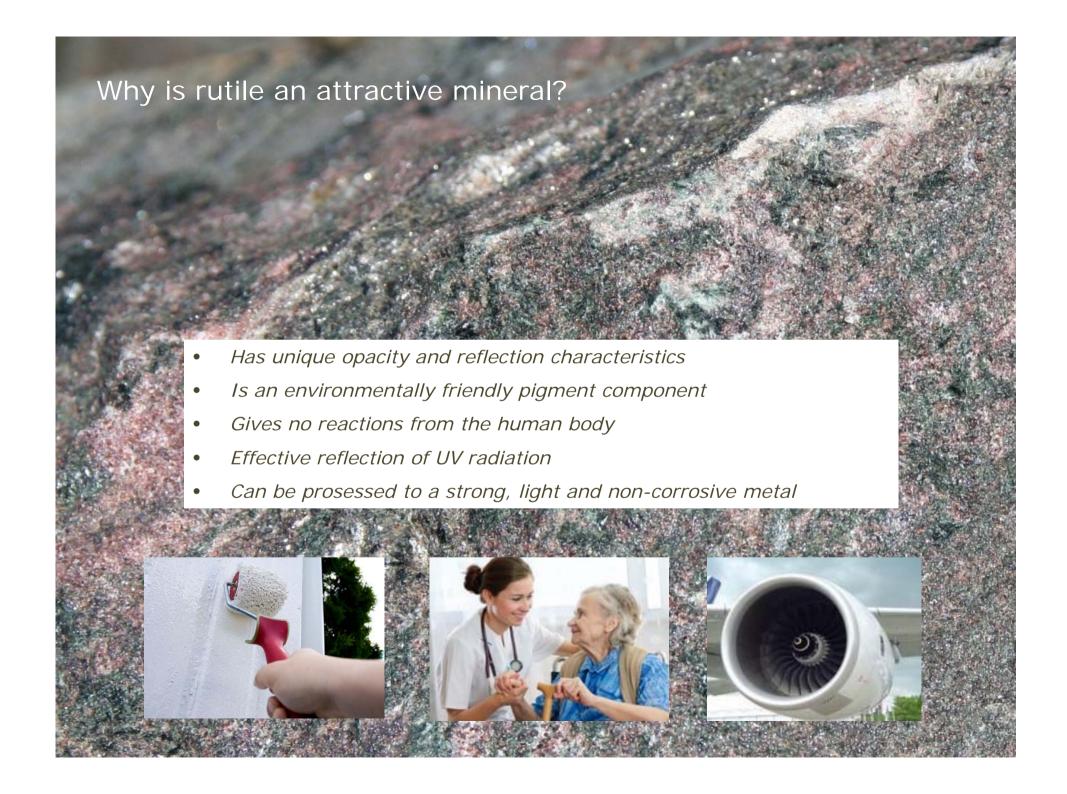
Source: Company websites

## The highest rutile grade and lowest impurity content



High grade ore with low impurities brings processing benefits and premium pricing





#### Garnet, by-product with benefits for the environment

- Preferred sand-blasting medium, replacing sand with contents of free silica
- Garnet is used as the primary cutting medium in water-jet cutting machines
- Annual global production of garnet is approximately 2 million tonnes
- Broad prices range depending of qualities
- Water-jet quality is typically sold for USD 445 per tonne delivered in Norway
- MOU signed with a reputable international industrial minerals producer







#### The TiO<sub>2</sub> value chain from mine to consumer



#### Mining

 Rutile is mined from ore or mineral sands producing a rutile concentrate



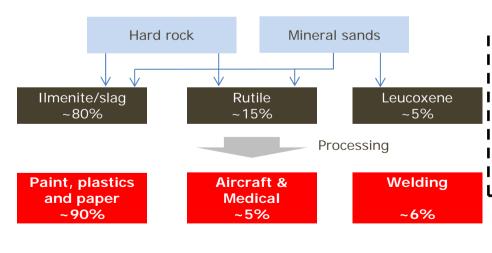
#### **Processing**

- Rutile is processed through chlorination in reactors which produces TiO<sub>2</sub> pigment
- Optional metallurgical process to produce titanium and related alloys



#### End use

- Majority of TiO<sub>2</sub> feedstock is used in production of pigment for paints, plastics and paper
- Approximately 5% is used for titanium



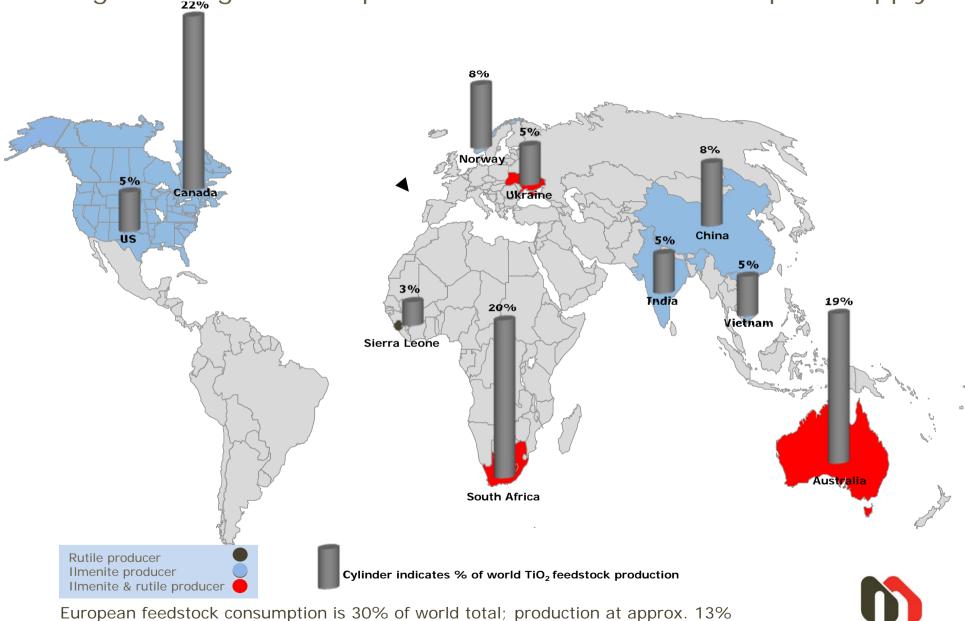
Natural rutile implies improved production and less waste vs ilmenite and other feedstock:

- ✓ Lowest consumption of ore
- ✓ Lowest consumption of chloride
- ✓ Less waste
- Lower production costs



TiO<sub>2</sub>; small part of total cost for end-use manufacturers with few viable substitutes

## Long sea freights underpin attractiveness of new European supply

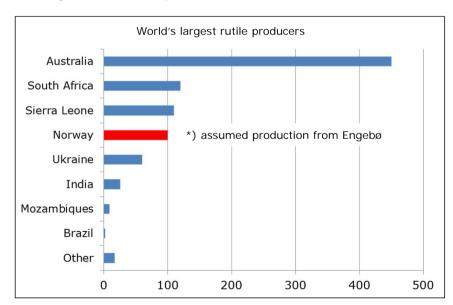


Source: TZMI

## European pigment majors will be future customers

#### Regional, stable supply brings customer benefits

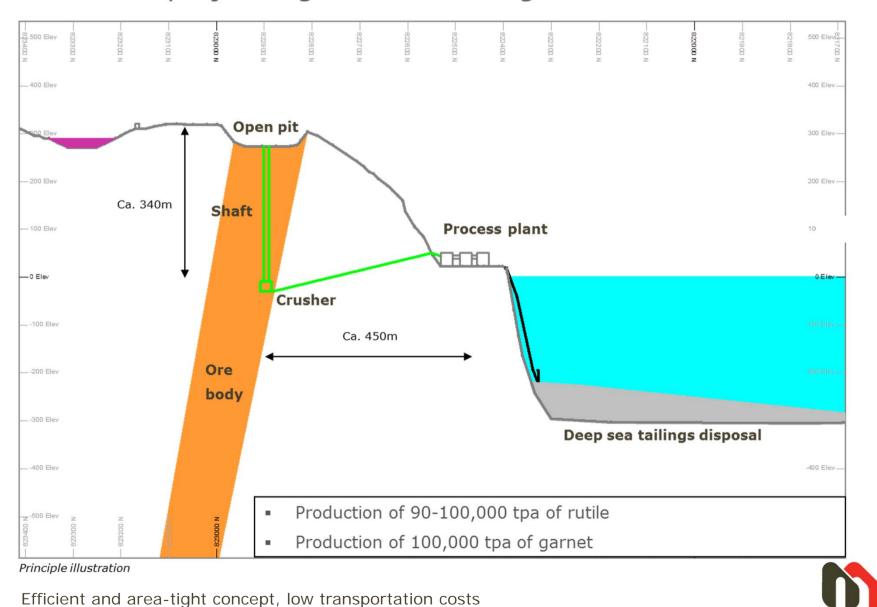
- Substantial freight reduction compared to existing supply
- Plant-to-plant shipment
- Simple logistics improve working capital, storage and planning
- Several European customers can each take Engebø's annual production







## Favourable project logistics and configuration



## Preliminary key figures

Engebø key figures	
Life of mine	50 years
Open pit production	10 - 15 years
Underground	35 - 40 years
CAPEX	USD 300 million
NPV after tax @ 8% WACC	USD 466 million
IRR after tax	20.7 %
Payback time (CAPEX/EBITDA)	4.5 years
Break-even price for rutile (IRR = 0)	USD 370 per tonne

## Preliminary capital cost and OPEX estimates\*

Capex estimate	USDm
Royalties and land acquisition	13
Infrastructure and civil	83
Mine	17
Crushing facility	22
Wet process package	107
Dry process package	55
Laboratory and misc.	4
Total	300

OPEX estimates (open pit)	USD/t rutile
Ex. by-product credit	550
Incl. by-product credit	185

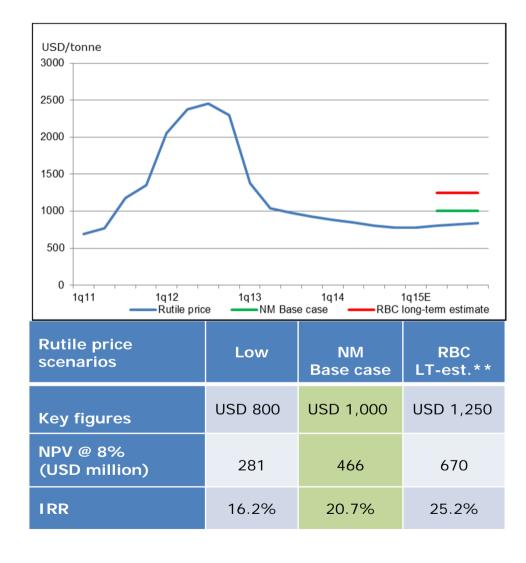
Peer comparison Sierra Rutile **	USD/t rutile
Incl. by-product credit 2014	646
Incl. by-product credit 2015est.	595-615

- The preliminary capital cost estimate includes approx. 20% contingency
- Capex review will be part of the continued project planning process
- Total construction time of 24 months
- Deep sea key already in place, ready to use

- Based on comparable operations in Norway and internationally
- By-product credits mainly from garnet which is produced without additional costs

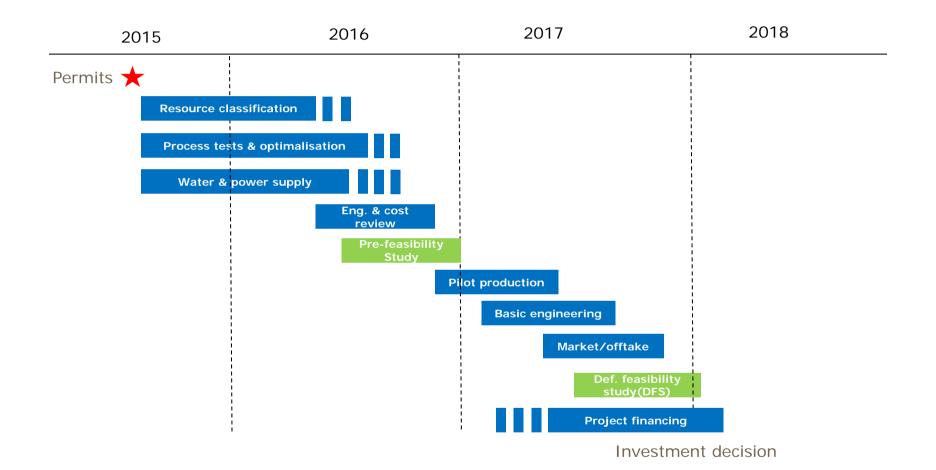


## Positive market outlook - robust project financials\*





## Project development – tentative timeline



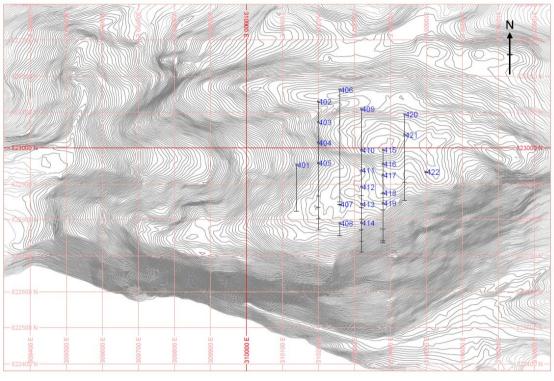


## Development activities towards PFS

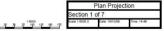
Activity	Further description	Cost estimate
Resource classification	<ul> <li>Core drilling approx. 6,500 meters in the open pit zone, drill core analysis, geotechnical assessments</li> <li>Resource modeling and estimations in accordance with the JORC Code 2012</li> </ul>	USD 1.4 million
Process testwork and optimisation	<ul> <li>Further process tests and optimization of flowsheet</li> <li>Target: Increased rutile recovery and define cost-effective process solutions</li> <li>Reduce or avoid flotation?</li> </ul>	USD 2.0 million
Engineering and cost review	<ul><li>Pre-engineering</li><li>Updated estimates for Capex/Opex</li></ul>	USD 0.5 million
Supply of process water and hydropower	<ul><li>Assessment of alternatives</li><li>Applications with supporting documentation</li></ul>	USD 0.6 million
Technical advisor and PFS coordination	Assessment of candidates ongoing	USD 1.5 million
Project management and overhead	<ul> <li>Lean project team; project leader and 2– 3 key persons</li> <li>General corporate overhead</li> </ul>	USD 3.4 million
Contingency	Approximately 10%	USD 0.9 million
Total		USD 10.3 million



## Drilling program will start in February

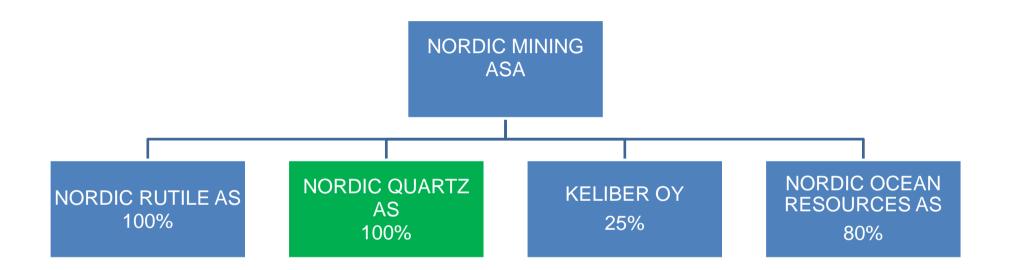


- Around 40 drill holes; approximately 6,500 meters, primarily in the open pit area – Finnish company Kati assigned
- Geotechnical assessments Wardell Armstrong assigned
- Resource modeling and estimations – Competent person Adam Wheeler





## Nordic Mining Group



## Nordic Quartz (100%) - Development in High Purity Quartz



#### Project highlights

- Estimate of 3.45 million tonnes of quartz, under exploration\*
- Mine life up to 60 years (30 years in base case)
- NPV of USD 60 million @ 8% WACC after tax
- Estimated production of 5,000 tonnes of HPQ pa
- Ultra-high quality demonstrated for advanced applications/markets



#### Key features

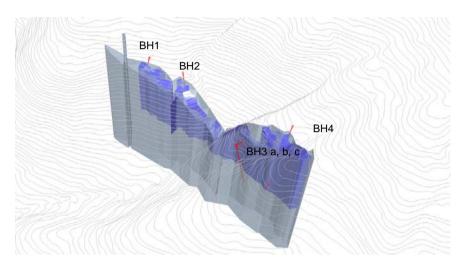
- Outcropping hydrothermal quartz deposit
- Low in critical elements as Ti, Al, Fe, P, Na, K, Li, B
- Ideally situated, close to infrastructure and port
- Small-scale mining operation; 20 30,000 tonnes ore per year



## Completed core drilling will give qualified resource estimate 6 holes drilled of a total of 600 meters





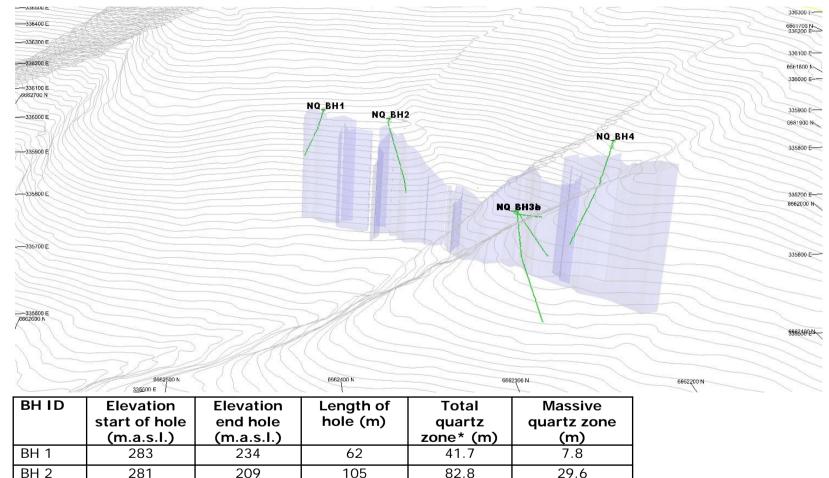


Quality	Total impurities (ppm)	SiO <sub>2</sub> %
Nordic Quartz	13	99.9987
IOTA Std	19	99.9981
IOTA 4	12	99.9988
IOTA 6	11	99.9989

Process tests document ultra-high quality



## Visual inspection of cores confirms significant quartz zones in all drill holes



BHID	Elevation start of hole (m.a.s.l.)	Elevation end hole (m.a.s.l.)	Length of hole (m)	Total quartz zone* (m)	Massive quartz zone (m)
BH 1	283	234	62	41.7	7.8
BH 2	281	209	105	82.8	29.6
BH 3a	231	204	66	37.2	20.4
BH 3b	231	150	97	53.2	12.5
ВН 3с	231	65	176	70.9	15.5
BH 4	309	205	121	97.8	57.5



## Scoping study\* reveals robust project financials

#### Project highlights

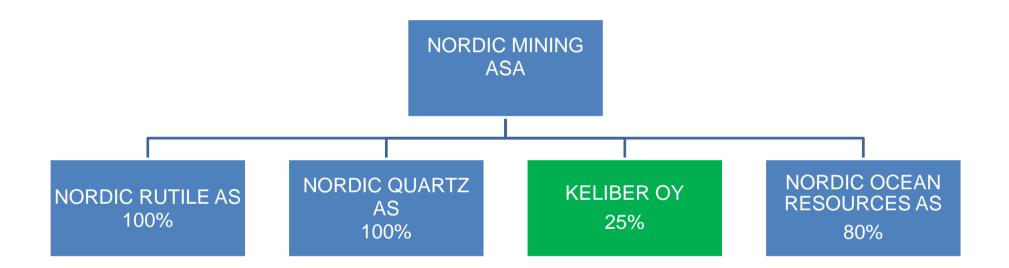
- Small-scale mining operation; 20,000 30,000 tonnes per year
- 30 40 employees
- Limited environmental impact
- High purity and high value products require advanced processing facilities

Key assumptions and figures	Units	Scoping study
Annual production/sales of HPQ	Tonnes	5,000
Average HPQ product price	USD/tonne	6,700
Operating cost	USD/tonne	4,000
CAPEX	USD million	49
NPV after tax @ 8% discount rate, 30 yrs LOM	USD million	60
IRR after tax	%	20.5
Pay-back time (CAPEX/EBITDA)	Years	4.3





## Nordic Mining Group





## Moving forward in high-grade lithium





- Estimated 6.2 million tonnes mineral resource at an average grade of 1.26 Li<sub>2</sub>O (JORC Code 2004/2012)\*
- Region with promising exploration potential
- Cost efficient and environmentally friendly processing method
- Pre-Feasibility Study scheduled early 2016



#### Key features

- Mining permit in place for the Länttä deposit
- Ideally located; excellent infrastructure and port facilities
- Demonstrated +99.9% Li-product suitable for advanced battery applications, i.a. for EV/HEV
- Expected high growth rate i.a. for HEV batteries;
   CAGR 15% for the period 2015 2019\*\*

Keliber targets to be the first producer in Europe of battery grade lithium carbonate

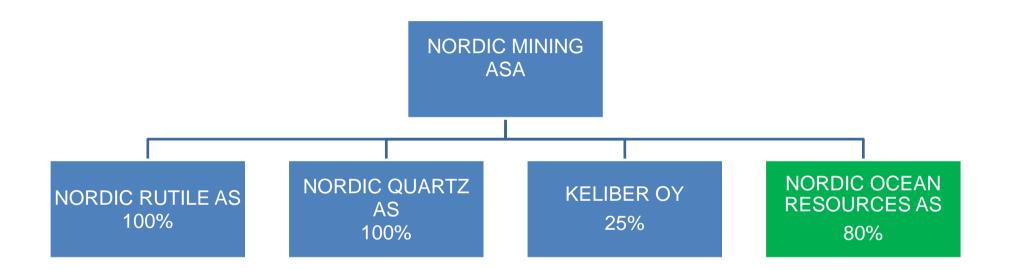
## Keliber Oy – Steadily increasing resource base

Category	Deposit	Tonnage (1,000 tonnes)	LiO <sub>2</sub> %
Measured	Länttä	433	1.12
Indicated	Länttä	868	1.06
	Syväjärvi	1,668	1.34
	Rapasaari	1,956	1.25
	Outovesi	289	1.49
	Leviäkangas	190	1.13
	Emmes	818	1.40
Indicated total		5,789	1.28
Measured and Indicated		6,222	1.26
Inferred	Syväjärvi	73	1.58
	Leviäkangas	271	0.90
Inferred total		344	1.04

- Successful drilling in Rapasaari winter season 2014/2015
- Re-analysis confirmed higher lithium grade from Syväjärvi
- Keliber's resource base has increased with 86% from October 2014 till April 2015 (Measured & Indicated)



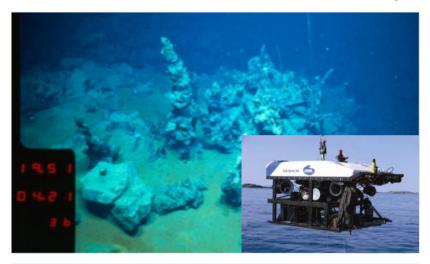
## Nordic Mining Group





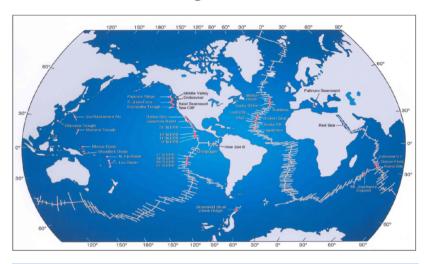
## **NORDIC OCEAN RESOURCES AS** (80%)

## Pioneer in seabed mineral exploration in Norway



#### Company highlights

- Nordic Ocean Resources (NORA) has taken a pioneering initiative for exploration of Norway's seabed mineral resources
- NORA has established in-house competence and excellent network with national and international companies and institutions
- NORA has participated in a pre-project for the first estimation of possible mineral resources in the Norwegian Economic Zone (EEZ)



#### Company highlights

- NORA has applied for exploration licenses in the Norwegian Economic Zone, and has ambition to be the first company exploring for seabed minerals in Norway
- NORA participates in the MARMINE project having received NOK 25 mill. in grants from the Norwegian Research Council
- The MARMINE project will follow up the pre-project and contribute to the knowledge base for seabed mineral resources

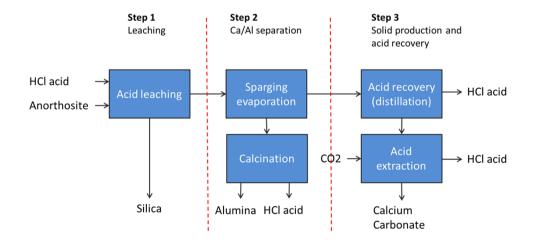
Leveraging Norway's subsea technology

## Patent granted for new alumina technology An alternative process for production of alumina

- Nordic Mining and Institute of Energy Technology (IFE) has jointly developed a new, patented technology for production of alumina from anorthosite
- The technology utilizes mineral acid and CO<sub>2</sub> to produce alumina, silica and calcium carbonate (PCC) from anorthosite under moderate process conditions
- The technology is an environmentally friendly alternative, producing close to no waste and consuming CO<sub>2</sub> that is bound in calcium carbonate



Anorthosite is a feldspar rock consisting almost entirely of alumina (30%), calcium oxide (15%) and silicon oxide (50%)





#### Investment highlights

#### Significant value potential

Sum of the project NPVs @ USD 550 million\*
 vs. market cap. below USD 30 million



- World class rutile deposit;
   50 years mine life and highest global TiO<sub>2</sub> grade
- Close to market location, competitive Capex/Opex and favourable logistics
- Approved zoning plan and waste disposal permit (Environmental permit)

#### **High Purity Quartz**

Significant value opportunities in green-tech mineral

#### Lithium

Pioneer in European lithium carbonate production



Titanium - natural rutile



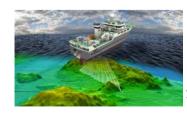
High Purity Quartz



Lithium



Platinum, Palladium



Seabed minerals exploration



