### Ludvika Iron Mines Europes next high grade producer

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Iron Ore

#### What defines a good iron ore project these days?

- Access to railway direct to deep sea port
- High Grade fines/concentrate >65%
- Large iron resources, JORC compliant
- Low operating costs
  - >30 USD/dmt 62% Fe, FOB
- Low capital intensity
  - <130 USD/annual tonne production, 62% Fe</p>
- Scaleability
- Mining friendly legislation
- Low political risk
- All permits in place providing project continuity

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#### **Nordic Iron Ore**

#### **Reopening Ludvika Mines**

- All Permits now in place
- Large mineral resources with expansion
- High Specification Mainline Railway network.
- Oxelösunds Port: Babycape capacity
- Swedish State new investor
- DFS phase 1 ready H1 2016





#### - At a glance





#### **Our targets**

- Production Phase I = 1.43 Mtpa
- Commissioning new beneficiation plant Q4 2018
- Production at full capacity = 4.3 Mtpa





#### Niché Producer of High Quality Product

- 69% Fe Concentrate
  - Magnetite/ Hematite
- Low impurities
- Demand moving towards higher quality

At a competitive cash cost:

USD 43/dmt (FOB) (normalized USD38/dmt @ 62%Fe)





#### Ludvika Mines vs planned/ongoing (?) IO project High quality niché producer

Global Iron Ore Projects - Product Quality vs Cost



\* Risk-adjusted / normalized cost based on incentive price analysis completed for 30 selected iron ore projects at risk-adjusted discount rates. Normalised incentive prices, 1=median project. Source: CRU Incentive Price Analysis, May 2014

Source: CRU, SNL Metals & Mining, company reports, KPMG analysis

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#### **Solid economics**

Phase I (stand alone):

CAPEX USD 180 m
 <USD130/dmtpy</li>
 IRR 18% (@TSI US\$75)

- At full production 4,3 dmtpy
  > IRR 30 % (@TSI US\$75)
- 15+ years life of mine





#### Summary: main project characteristics

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## Existing logistics & fully permitted



High quality product

	Compositivo Conov/On
3	







#### Bergslagen – A historic Mine Region since 800+ years

Iron OreBase Metal





#### The Ludvika area Extensive Iron Ore mineralisations covered

MAGNETIC TOTAL FIELD MAP - BLÖTBERGET-HÄKSBERG AREA





#### One of Sweden's largest iron mineralisations Current Mineral Resources



#### Väsman - Additional Expansion potential



#### Beneficiation plant next to existing railway





#### Ludvika Mines – Integrated scaleable project

#### Development in three phases





# Ludvika Mines – Phase 1 Blötberget surface & underground



#### 3D-view of orebodies and old mine layout



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#### Ludvika Mines – Phase 1 Blötberget Footwall view of new mine layout and orebodies



#### New process Plant and Train Terminal

Trafikverket (Swedish rail authority) completed terminal design & ready for procurement & construction







Phase 1 train terminal Future extension Phase 2-3

#### Ludvika – Oxelösund- The Heavy Gauge Rail Route

Multiple by pass alternatives





#### Oxelösunds Port Existing High Capacity Bulk Port





#### Low development risk

- Existing logistics
- Existing mine infrastructure
- Existing services
- Scaleable project
- Permits in place
- Low capital intensity
- Experienced team in place





#### Market Segmentation - overview High Grade, Medium Grade, Low Grade Iron Ore



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#### Junior mining development

Lessons learned – some common denominators

- No real mine development & construction experience at board level
- Limited experience from execution of complex construction projects at management level.
- Short cuts at DFS stage
  - Time constraints
  - Cost constraints
  - Organisational and system constraints
  - Insufficient process tests, ie only bench scale tests, limited representative samples
  - Blurring the picture- SPV for logistics and other adjacent important functions spun outside the DFS
- Disconnect between the DFS and the construction phase
  - Can depend on changes due to issues at the permitting stage
  - Delays in securing construction financing
  - New project team with no relation to the study phase
  - Too little focus on the execution plan in the DFS





#### Is it possible to succeed as a junior these days?

- Brown field –industrial redevelopment
- Efficient mine & high grading process layout
- Access to existing rail and port logistics
- IO product > 65% Fe
- Transparent legislation and permitting processes
- Access to financing at the right time

#### Small is still possible

& Quality beats Quantity









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## Thank you

Christer C. Lindqvist www.nordicironore.se



