



Garpenberg expansion

CMD 21 November 2013

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Garpenberg 2.5

Garpenberg Expansion - recap

- Capex SEK 3.9 billion
- Period 2011 - 2014
- New industrial area
 - New underground facilities
 - New concentrator
 - New infrastructure
- From 1.4 to 2.5 mt of ore/year
- Ramp-up, 2 mt/year 2014 to full production end 2015
- Average grades in mineral reserve
 - Zinc 5.1 %
 - Lead 2.0 %
 - Silver 131 g/t
- Good geological potential



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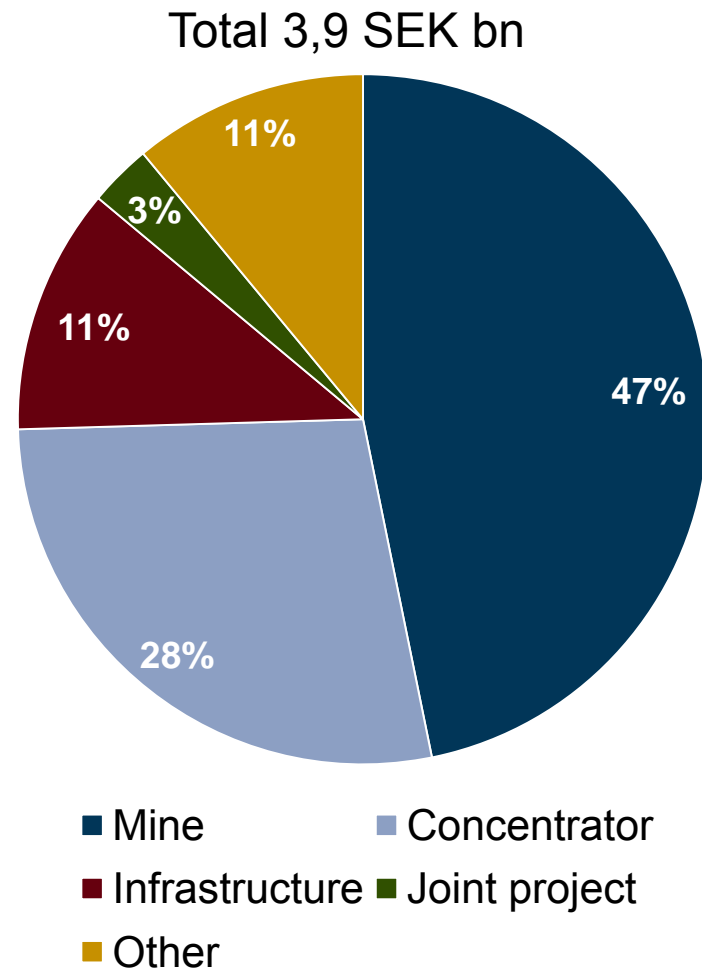
Environmental performance

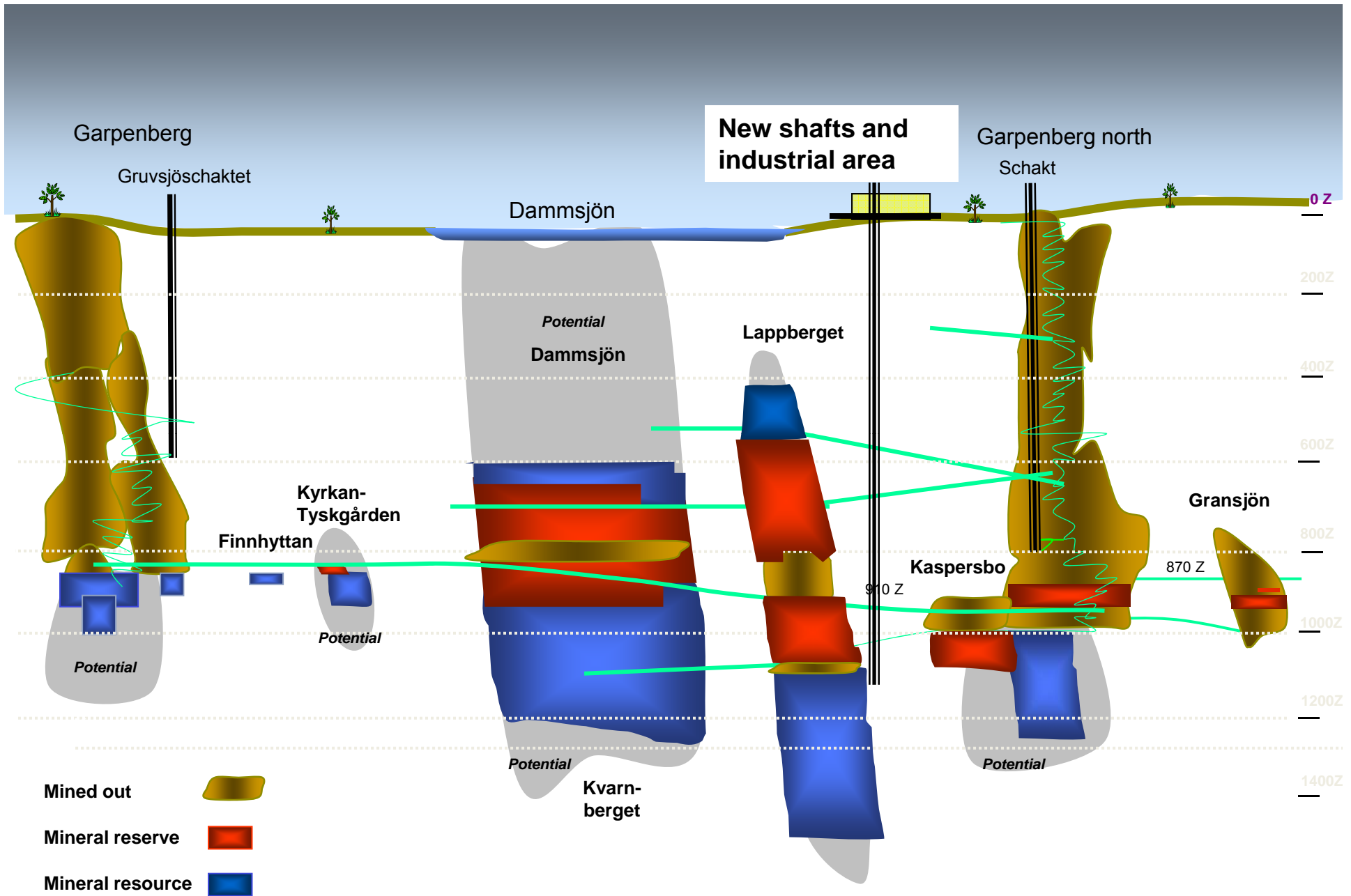
- Decreased energy consumption per ton of produced ore
- Decreased water usage per ton of produced ore
- Lower noise levels to nearby community
- New environmental permit granted in January 2012



Garpenberg expansion – Capex components

- Mine
 - Excavation
 - Hoisting, crushing and skip station
 - Mine ventilation
 - Media-, paste-, electric system
 - Mobile equipment
 - EPCM (DP-management, engineer work etc)
- Concentrator
 - Ore stock
 - Concentrator
 - EPCM
- Infrastructure
 - Roads, ground work, project area
 - Buildings
 - Electric power - distribution, switch gear
 - EPCM
- Joint, other





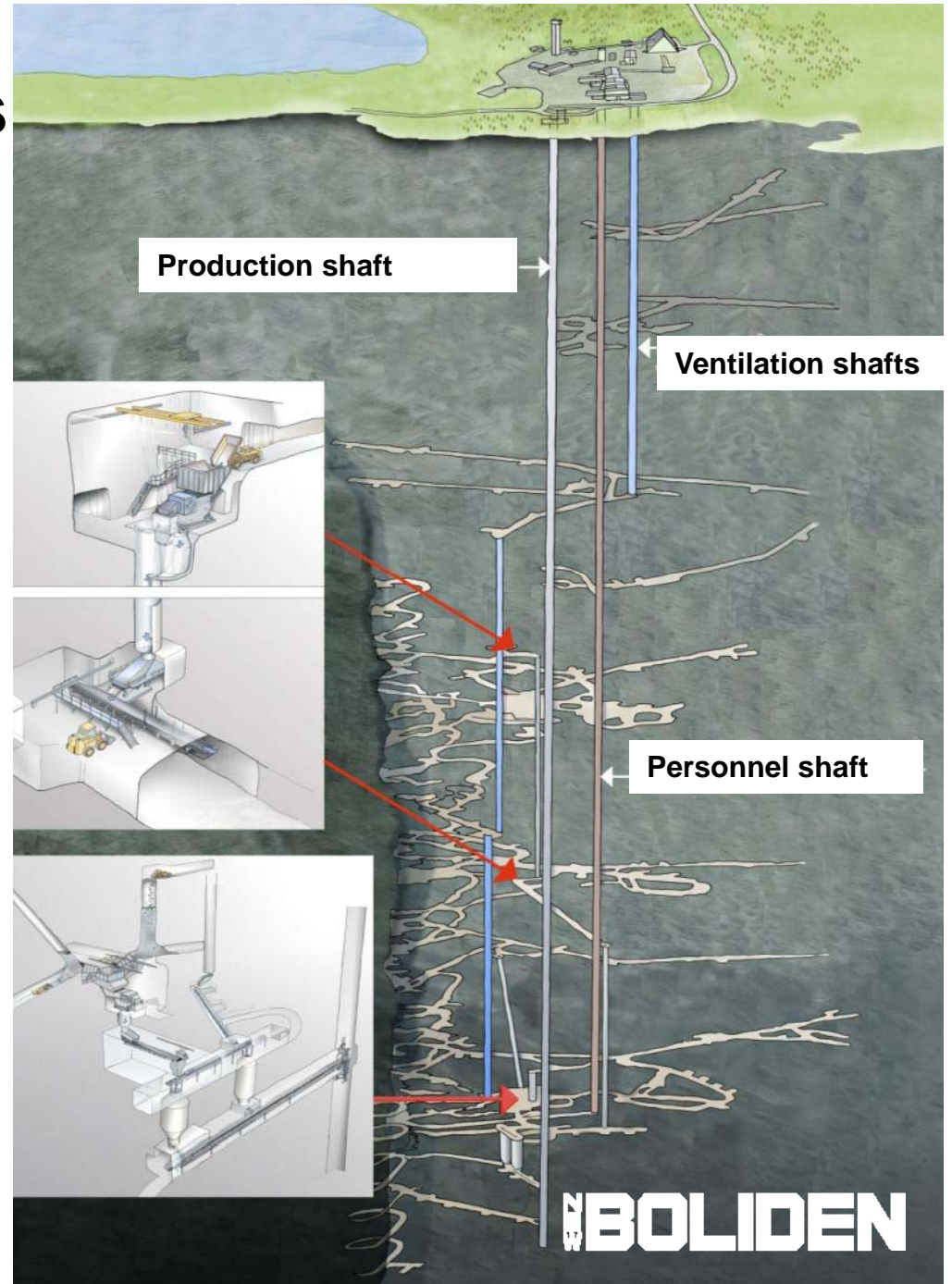
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Milestones

- January 17, 2011 Project approved
- January 18, 2011 Start raise boring shafts
- April, 2011 Procurement started
- January 31, 2012 Environmental permit granted
- February 1, 2012 Start civil works
- February, 2013 Concentrator erected
- July, 2013 Production shaft open
- Fall 2013 Mechanical installations
- Fall 2013 Electrical installations
- 2014 H1 Production
- 2015 Production of 2,5 Mton

Underground facilities

- Production shaft
- Personnel shaft
- Ventilation shafts
- Crushing stations
- Ore handling system
- Pumpstations



Crushing station 1087 – March 2012

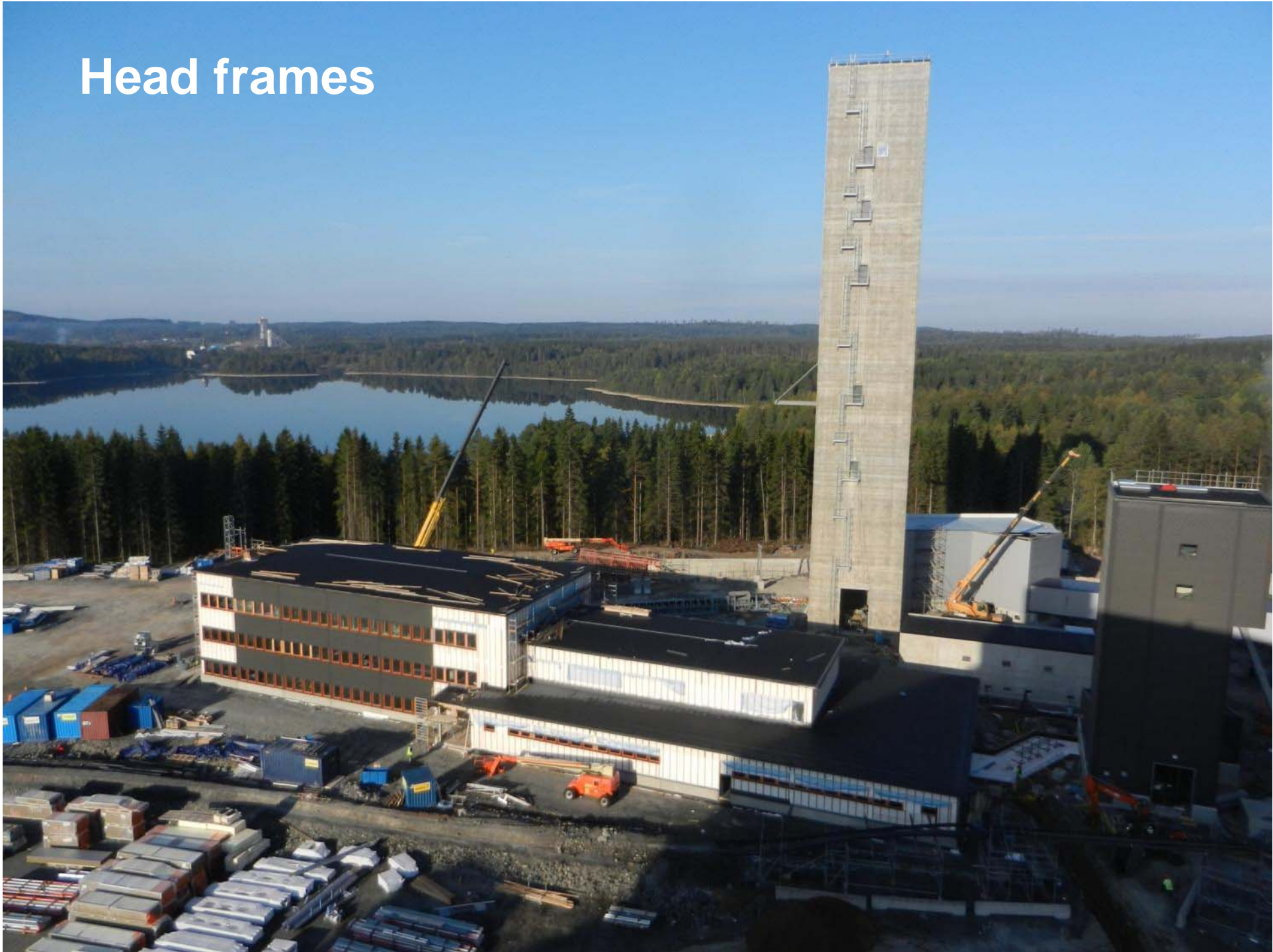


Crushing station 1087 – Sep 2013

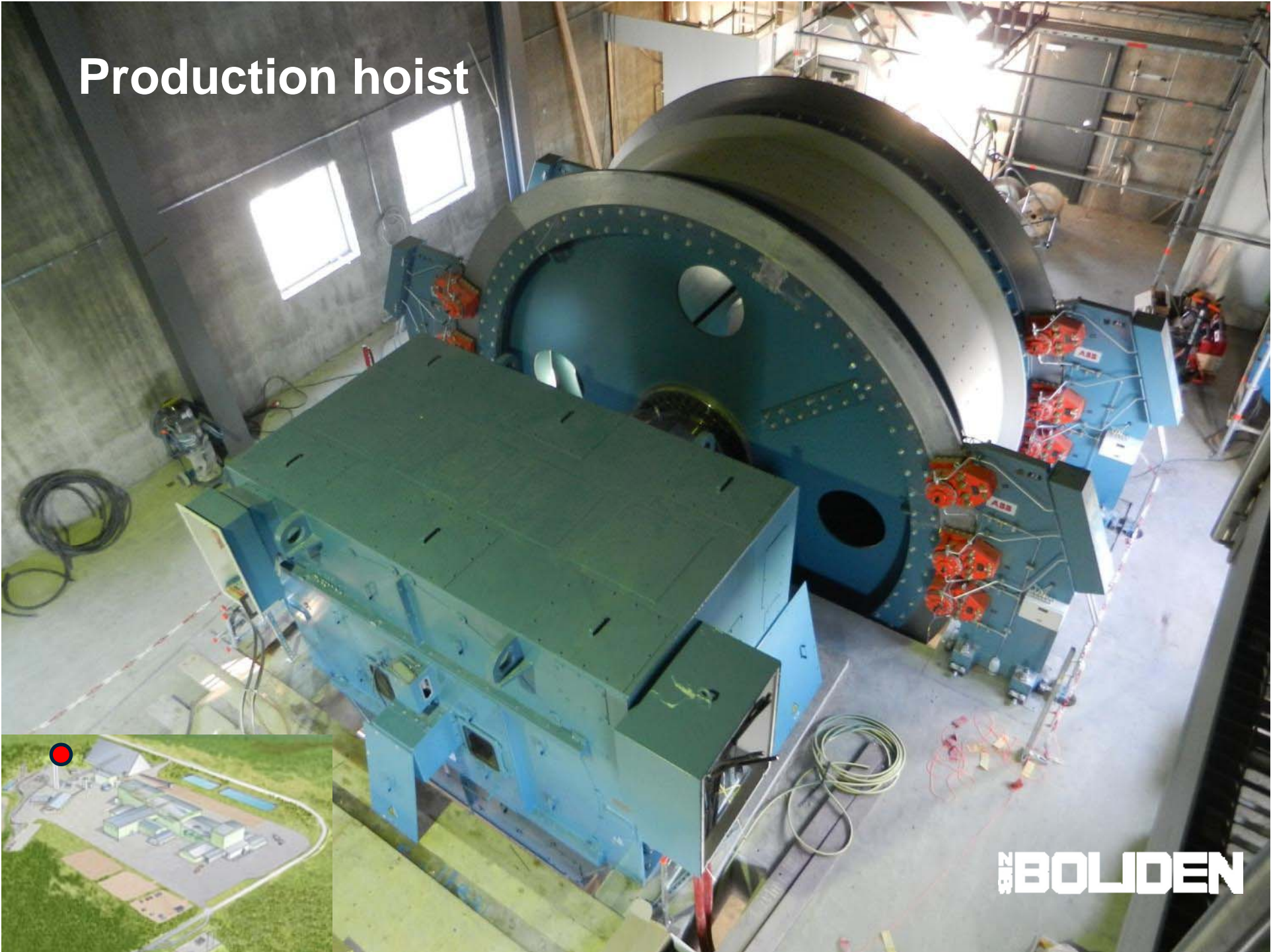


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Head frames



Production hoist



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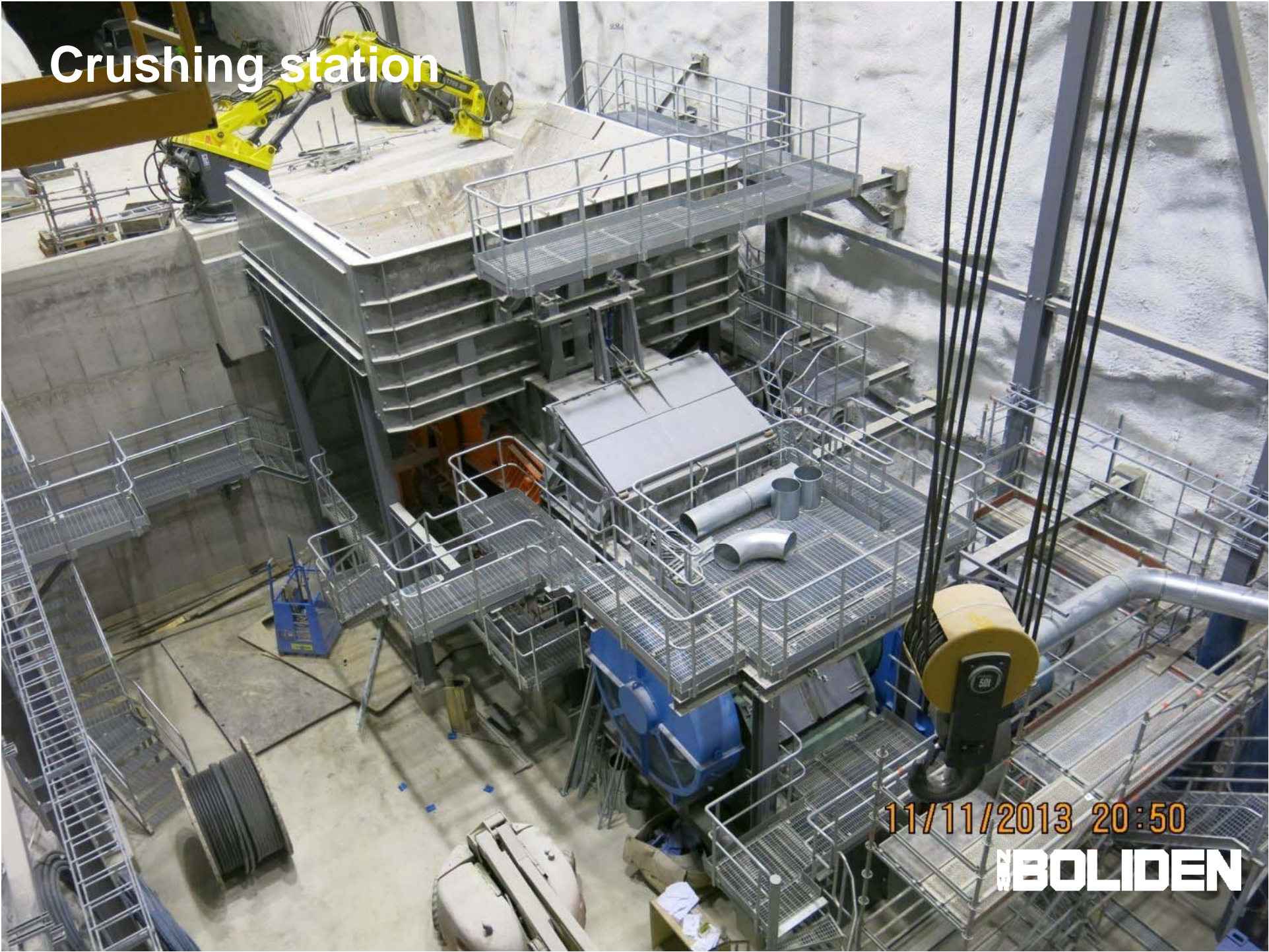
Personnel shaft



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Crushing station



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Ore handling system



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New industrial area



Industrial site – April 2012



Industrial site – May 2013



Ore storage



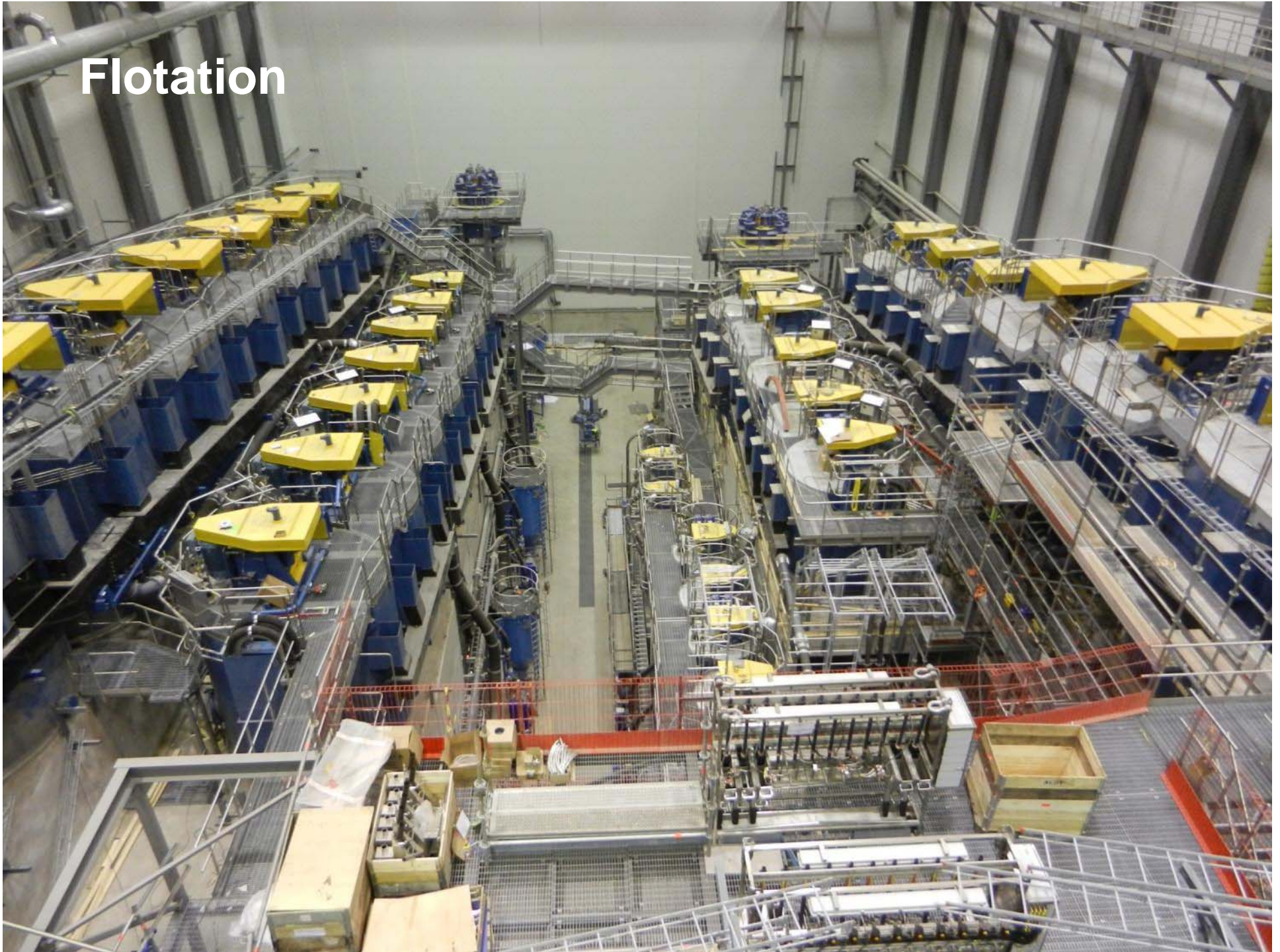
Concentrator



Grinding



Flotation



Power supply



Project control and management

➤ Lessons learned

post

➤ Challenges

ongoing

➤ Opportunities

future



Lessons learned

post

- ✓ Organizational
- ✓ Project manual
- ✓ Project resources
- ✓ Procurement process
- ✓ Cooperation with contractors
- ✓ Reuse successful solutions



Challenges

ongoing

- ✓ Safety
- ✓ Engineering
- ✓ Shaft works
- ✓ Time planning
- ✓ Coordination
- ✓ Creativity – flexibility..



Opportunities

future

- ✓ Preparatory work
- ✓ Project manual
- ✓ Experienced personnel
- ✓ Standardised engineering solutions
- ✓ Preferred suppliers



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Conclusion

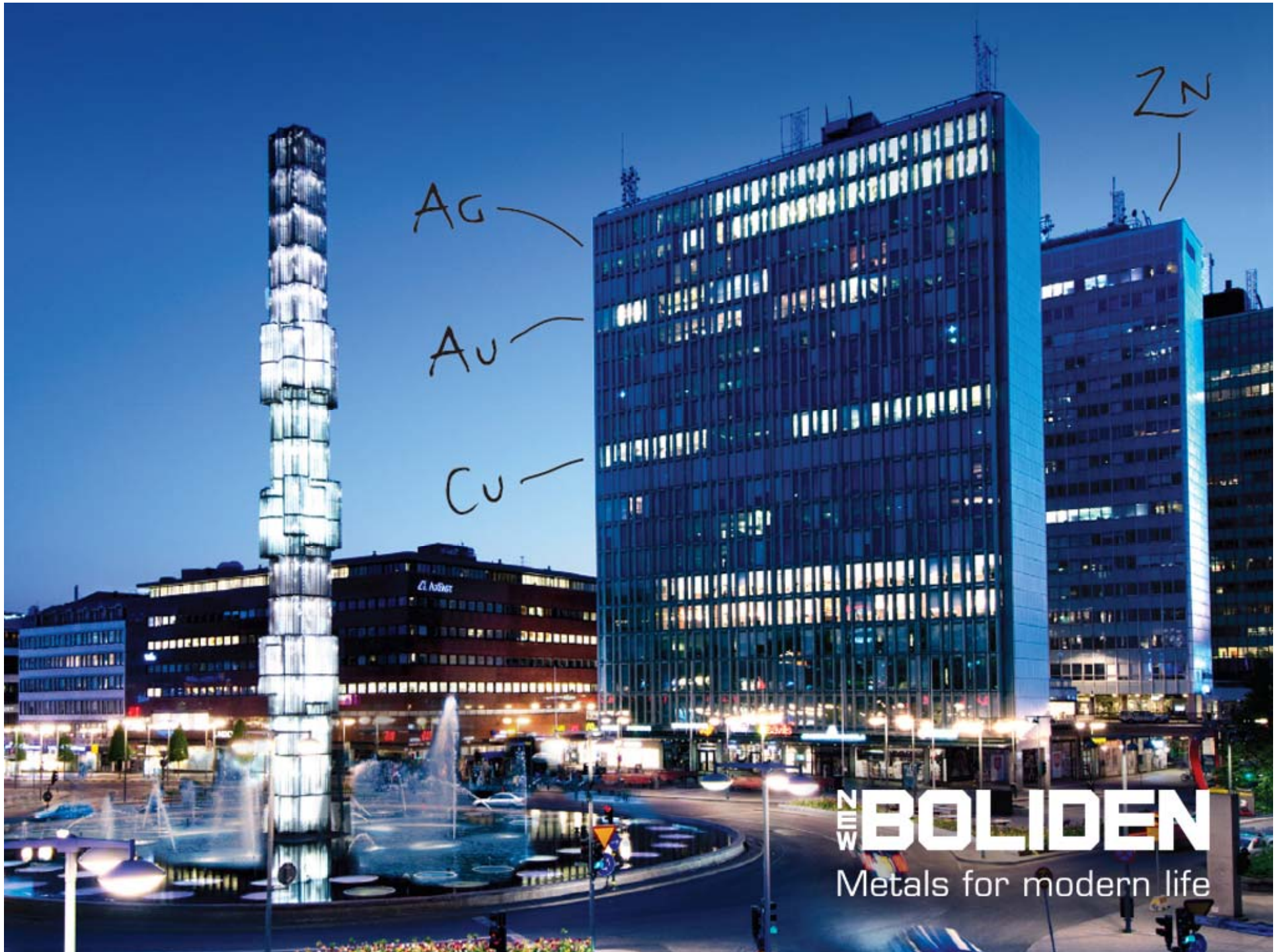
- Nearly doubling of production
- Lower production cost per tonne of ore
- Long life of mine in spite of higher production
- Geological potential high
- Project on plan



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Ag

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Cu

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