INTRODUCTION

Taking up to 30% of operating costs, the energy costs associated with mining are a key strategic focus in the sector. At the same time, the cost, reliability, and ubiquity of renewables mean that assessing renewables options is becoming standard practice within mining companies.

Additionally, carbon risks associated with GHG emissions regulations and increasing energy costs are also now material to the mining business. With carbon and renewables legislation in place in central mining markets and increased shareholder pressure to address climate change, mines are also actively exploring alternative energy and storage as a means of cutting CO2 emissions as well as addressing the power pricing and supply concerns.

There is no doubt that mining and renewables are two great industries that would work well together. However, there are cultural, historical and even grammatical differences between the sectors that inhibit the speed of development of mine renewables projects.
WHO SHOULD ATTEND?

✔ Business developers from power engineering, procurement and construction (EPC), independent power producers, O & M, and renewable developers
✔ Manufacturers: engineering equipment for mining and renewables, energy storage and electric vehicles
✔ Electric companies, government mining and energy officers, industry associations, renewables R&D
✔ Mining professionals were looking for a better understanding of low carbon mines and sustainable commodities production.

LEARNED OUTCOMES

This course is essential for energy professionals currently involved, or who would like to be involved, in energy for mining projects. The workshop has been enjoyed by a cross-section of professionals involved in energy, mining, and trade.

At the completion of this course participants will be able to:

✔ Appreciate the significance of energy in the mining industry (grid-tied & off grid)
✔ Understand frequently used terminology
✔ Describe the use of power for open pit and underground mining methods
✔ Understand the principles of mine exploration, design, planning, operation, and closure
✔ Understand the impact of energy on social and environmental considerations and local communities
✔ Understand the production chain of mining from processing to extractive metallurgy and from pit to port
✔ Figure out and develop specific solutions based on benchmarking processes linked to relevant case studies
✔ International networking development with other professionals and former attendees of the eleven previous workshops
Detailed Content

An Essential Introduction to Mining for Energy Professionals
Pre-Congress Workshop: December 1, 2019

Session A:
The Mining Lifecycle

Lesson 1: Minerals, Ore and Metals
Basic definitions: energy, mineral, metals and alloys, and non-metallic minerals, mining geography, mineral and metals economic value, metals use intensity, and the mine lifecycle.

Lesson 2: The Mining Exploration
Reserves and resources, licensing, greenfield vs brownfield, geophysics and geochemistry, exploration, drilling, geological models, pre-feasibility reports, junior mines valuation, and finance modeling.

Lesson 3: The Mining Planning
Infrastructure (energy, water, transport, dewatering), workforce, FIFO, social and environmental considerations, social license, mine cost curves and economic decision point, feasibility report, and senior mines valuation.

Lesson 4: The Mining Operation
Open pit and underground mining, strip and alluvial mining, off-grid mining vs. on-grid mining, pit to plant, concentrates, and final metals.

Lesson 5: The Mining Closure
Closure vs. reclamation, care and maintenance, economics of mine closure, closing a mine, and closure examples.

Session B:
The Mineral Processing

Lesson 6: Pit to Plant and Comminution
Blasting, excavation and haulage, mucking, crushing, grinding and milling, comminution, waste, and ventilation.

Lesson 7: Separation and Concentration
Grading separation, density and magnetic separation, floating cells, dewatering, dam and evaporation ponds, tailings, thickening, drying, and metal concentrates.

Lesson 8: Extractive Metallurgy
Hydrometallurgy (leaching), pyrometallurgy (smelting), furnaces (smelting and cleaning), electrometallurgy, refining electro wiring, and sulfuric acid and bypass products.

Lesson 9: Pit to Port to Shipments
Trucks and trains to port, conveyor belts, fluvial transport, mining ports, storage area, coal and iron ore and base metal ports, and shipment sizes.

Lesson 10: Mining Economics Intro
Production costs, type of cash costs, capital expenditure royalties and taxes, profit and loss, mining balance sheet, working capital, valuation: DCF, and junior mines valuation.

Lunch Break
AN ESSENTIAL INTRODUCTION TO MINING FOR ENERGY PROFESSIONALS
Pre-Congress Workshop: December 1, 2019

SESSION C: ENERGY USES IN MINING

- **Lesson 11: PIT TO PLANT ENERGY USE**: Fuel, heat and electricity in mining, energy in blasting, lighting, fuels in excavation and haulage, energy in truck maintenance, and energy intensity per ton KPI.

- **Lesson 12: ENERGY IN BENEFICIATION / CONCENTRATION**
  Power in crushing, power in grinding, energy in aggregates, comminution for industrial minerals, precious metals, ferrous metals, base metals, energy in floating, energy density, and magnetic separation.

- **Lesson 13: ENERGY USE IN EXTRACTIVE METALLURGY**
  Energy in leaching (hydrometallurgy), power in smelting (pyrometallurgy), power in refining (electrometallurgy), energy intensity in major metals, and solar heat mining applications.

- **Lesson 14: ENERGY IN ANCILLARY AND WATER SERVICES**
  Ventilation energy costs, energy use in mining camps, cleaning and maintenance energy, power in pumping water, power in desalination, trends and KPIs, energy in mining IT services, and energy requirements for security in mining.

- **Lesson 15: MINE TYPE AND TRANSPORT ENERGY USE**
  Open pit vs. underground energy use, off grid vs. on-grid, power in concentrates vs. end metals, locals vs. FIFO energy use, pit to plant and plant to port energy uses, energy in mining ports and airports, and electric vehicles in mining.

- **COFFEE BREAK**

SESSION D: MINING CSR & RENEWABLES

- **Lesson 16: ENVIRONMENTAL RESPONSIBILITY**
  Waste rock and tailings, acid rock drainage, dust, noise and vibration, quality control (soil, flora, fauna, water, air), waste management, GHG emissions, carbon footprint, sustainable mining, and EIA process.

- **Lesson 17: SOCIAL RESPONSIBILITY**
  CSR for employees and local communities, environmental and social CSR, case studies from North America, Latin America, and Australasia, and CSR annual reports in mining.

- **Lesson 18: RENEWABLES IN MINE CLOSURE AND RECLAMATION**
  Submission requirements for a reclamation plan, financial assurance, examples of standard closure, wind and solar PV mining closures, hydro storage pumping mine closures, and environmental liability vs. energy assets.

- **Lesson 19: RENEWABLES & RESPONSIBLE MINERALS**
  Renewables and mining segments, size of the market and trends to 2050, process of tendering in mining, mining supply clusters, and responsible minerals.

- **Lesson 20: CONCLUSIONS**
Dr. Arnoldus M. van den Hurk works with clean energy professionals and companies to get mining clients by consulting. Arnoldus also visits and analyzes mines around the world making in-mine seminars. He has a Ph.D. in Geology from Barcelona and Tubingen Universities and MBA from Madrid – Shanghai (Tongi University). He is the General Manager of r4mining and Director of REMIO (Renewable Energies and Mining International Observatory).

For 30 years, Arnold has been an adviser and professional in geo-mining, renewable energy, and financial analysis.

He has a successful background in strategic sales and marketing for industrial markets (oil refineries and coal mining, vehicle factories, thermal and nuclear plans and so forth).

He has worked in mining exploration and valuation, mining operation analysis, and some trade commodities in Europe, South America, the Caribbean, Africa, and China. For the last 15 years, he has gained extensive knowledge and experience in the renewable energies sector.

For him, Mining and Clean Energies are the fundamentals for Climate Change Mitigation.

Currently, his core business is to help companies and energy professionals to get mining clients by consulting, coaching and mentoring programs.

Arnoldus also helps mining companies to get responsible minerals’ clients through consulting in climate-smart mining.
PREVIOUS WORKSHOPS

SANTIAGO
Chile 2015

JOHANNESBURG
South Africa 2015

TORONTO
Canada 2015

SANTIAGO
Chile 2016

TORONTO
Canada 2016

LONDON
UK 2016

TORONTO
Canada 2017

PERTH
Australia 2017

PERTH
Australia 2018

TORONTO
Canada 2018

PERTH
Australia 2019
**PREVIOUS ATTENDEES**

**IPP, Engineering & Construction**

![List of attendees]

**Manufacturers and Equipment**

![List of manufacturers and equipment]

**Power & Fuel (Utilities)**

![List of power and fuel utilities]

**Mining, Institutional and Others**

![List of mining, institutional and others]

**TESTIMONIALS**

**RIOGlass:** “We already worked in mining regions but only with power companies. However, we couldn’t meet the miners because they didn’t get on the phone. Thanks to the Workshop in Toronto, we rethought the strategy and, in two months, we have already received three private tenders from three different mining companies. We strongly recommend any energy company to attend the Workshop if you are looking to succeed in the mining market.”

**Carbon War Room (Sunshine for Mines):** “Your presentation was delightfully informative and relevant in describing the diverse mining processes and how they best integrate with renewable energy as well as supporting the clear business case for renewables in mining – the presentation opened my eyes to both the barriers and possibilities of renewables in mining and reinvigorated my motivation towards global carbon reduction – much appreciated.”

**Panasonic:** “I found Arnold’s workshop to be the highlight of the conference. For those new to the mining sector, it will lodge you out of the conference. And for mining veterans, it helps provide perspective and clarity on corporate priorities in the industry.”

**Barick Gold:** “What you presented was a very sophisticated yet practical review of the mining industry.”

**Siemens:** “With Mining being such an important industry in Chile, I found the course very good in understanding the basic mining processes and the energy requirements of each of these.”

**Gamesa:** “The Arnold’s (Energy & Mines) workshop contains all the mining information an energy company may need compiled in a very intensive and productive session. Attendees will learn the best way to overcome miners worries, how to size the requirements for each mine and how to propose renewable solutions for mining.”

**Juwi Renewable Energies:** “Arnoldus brings great insight into the world of mining and renewables and his workshop addresses key metrics of both areas while connecting mining and renewable energy specialists”

**Sunshift:** “Arnold’s workshop in Perth provided members of Sunshift’s engineering and business development teams with a comprehensive overview of the mining cycle in an open and collaborative environment. The workshop was well-structured and well-delivered to a mixed group of mining and renewables professionals.”
LOGISTICS

Cost and Registration: $995 plus HST

The fee for the pre-congress workshop includes:

- The full day of lectures, lunch and refreshments
- Digital copy of the full workshop materials
- Access to a repository with support material of multimedia information providing deep content on every aspect presented in the workshop

To register visit http://worldcongress.energyandmines.com/register/

LOCATION

The pre-congress workshop takes place at the

Marriott Downtown at CF Toronto Eaton Centre, 525 Bay St, Toronto, ON M5G 2L2, Canada

To book discounted accommodation use this link