



CEEC
THE FUTURE

ANNUAL REPORT

2021 - 2022

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Chair's Report

Marc Allen

2022 has been a year of change and renewal for CEEC - coming of course out of structural shift of the Covid-19 pandemic, CEEC itself has continued to go through some significant changes even as the world recovers and adapts to a new normal. Of course the challenges of sustainability, climate change and efficiency/productivity remain and the need for the work that CEEC does, even more critical.

Renewal at CEEC this year comes from the appointment of both a new chair and a new Executive President - along with a number of other changes to the internal operations of CEEC which should see us also renew our efforts in this space. I do sincerely thank all of the previous chairs of CEEC who have got us to where we are today - including immediate past chair Mike Battersby and previous chair Joe Pease - who are still serving on the CEEC board. Thanks also to former CEO Alison Keogh, who has been tireless in her efforts to promote the work we do at CEEC and ensuring our impact is maximised.

Together with Janine Herzig, the other CEEC board directors and our team of advocates and volunteers, we have a bold work program ahead of us. We are taking this opportunity of renewal to redefine our own vision and mission - looking to expand our remit to encompass other areas of the mining value chain and exploring how we support additional critical areas for the industry; such as climate change, decarbonisation and water management. We are committed to providing value to the industry as a whole and will work with our stakeholders and our sponsors to ensure the work we do adds value.

We have big plans for 2023 and beyond, including building on our work with comminution energy curves to encompass these other issues such as decarbonisation and water management. Watch this space as the year progresses.

Finally, I'd like to acknowledge the support of our sponsors - without whom none of this would be possible. We thank you for your patience during this time of change for CEEC and look forward to engaging with you all to ensure we continue to punch above our weight in providing high-quality outcomes for the mining and mineral processing industry.



Executive President's Report

Janine Herzig

I am delighted to be writing the President's Comment for this Annual Report for the year ending June 2022, my first at the helm of the CEEC International (CEEC).

It was a year of change for CEEC, with former CEO Alison Keogh stepping down in early 2022 and former Chair Michael Battersby stepping down in June 2022. Zeljka Pokrajcic also left the CEEC Medal Committee following the announcement of the 2021 winners.

However, the future is looking bright for CEEC International with a revitalised leadership group in place. I accepted the position of Executive President and Board Director, and Marc Allen took over as the new Board Chair.

It is great to be attending live events again, presenting opportunities to reconnect with people in-person to facilitate collaboration, as well as making new connections with people and companies within the industry who share CEEC's vision.

During the year companies such as STM Minerals, Maptek and Metso:Outotec joined our group of Sponsors, others renewed their sponsorship and we have more companies lined up to join in the 2022-23 financial year, which we will announce soon.

We are also planning a number of upcoming events, workshops, panel discussions and seminars to build on the success of the Spotlight Leader Conversations video interviews and the CEECing Change podcasts, both of which were launched this year. This will allow our Sponsors to interact with each other and learn from their collective experiences. In addition, CEEC is progressing other projects including the Global Water Initiative (GWI).

CEEC will soon be announcing additional changes to prepare for the next evolution of the organisation and its growth and expansion. These include clarifying our expanding focus from comminution to include water and tailings management, achieving net zero, decarbonisation and ESG.

Importantly this will focus on communications of the rebranding as CEEC International: Coalition for Minerals Efficiency and a much overdue update of our website.

I am proud to be part of CEEC as we embark on this new phase, and wish to thank our dedicated staff and contractors, as well as CEEC's Board, Advocates and Patrons. I also want to particularly thank our Sponsors for their support of CEEC's vital work.

Sponsors & Supporters

CEEC's not-for-profit work is made possible by the ongoing support of our sponsors, volunteers and in-kind supporters. Each year their contribution enables CEEC to build our networks and resources, communicate the latest technological advances, and award the prestigious CEEC Medal in Technical Research and Operations.

Together we can accelerate the transition towards reducing energy usage, emissions, and water utilisation. By sharing knowledge, we can tackle the shared industry challenges and identify cost savings whilst improving productivity and social value.

Thank you to our Sponsors and volunteers for your support of CEEC's vision and mission. Thank you to all the professionals who are working hard to improve sites, design and equipment, and for the part you play in a more sustainable future.

Sponsors



Media Partners and Supporters



2021 Medals

CEEC International awarded the recipients of its 2021 CEEC Medal, which recognises outstanding published research and field work that contributes to making mineral processing more eco-efficient.

For over a decade now CEEC has been championing greater sustainability in resources, with a strong focus on communicating knowledge, technology and approaches that reduce energy usage in the extraction of minerals with a focus on the high intensity breaking, crushing, and grinding processes.

The CEEC Medal award received 14 high-quality submissions from researchers, operators, and suppliers around the world, with entries judged by a Medal Evaluation Panel of four CEEC Directors.

CEEC congratulates each of the Award recipients for their outstanding work. Their contributions have the potential to reduce environmental impact and unlock hidden value for shareholders, not just in their own operations, but industry wide.

2021 CEEC Medal – Technical Research

Marcos Bueno, Janne Torvela, Rajiv Chandramohan, Tábatha Chávez Matus, Toni Liedes and Malcolm Powell for their paper titled The Double Wheel Breakage Test. This was published in Minerals Engineering, Volume 168, July 2021.



The authors collaborated from around the world, comprising Finland’s Marcos Bueno, Geopyörä and the University of Oulu’s Janne Torvela and Toni Liedes, Intelligent Machines and Systems, and Tábatha Chávez Matus, Oulu Mining School; Rajiv Chandramohan from Ausenco, Canada; and Malcolm Powell, Julius Kruttschnitt Mineral Research Centre, The University of Queensland, Australia.

The winning paper shares the development of a prototype breakage testing device, Geopyörä, and shows breakage calibration results that indicate its potential to improve geometallurgical ore testing.

Medal Evaluation Panel spokesperson and CEEC Director Greg Lane said the paper proposes a “genuinely better way to do something we already do”.

“This paper is a credit to the authors because it presents an opportunity to cost effectively increase our understanding of the ore breakage characteristics across an orebody and change the way we design plants,” he said.

“In presenting a detailed and complete description of a new testing device, this research offers huge potential to increase the scale of testing and number of comminution tests conducted for projects. This should allow for improved design outcomes, a reduction in project risk and better throughput (revenue) forecasting.”

2021 CEEC Medal – Operations

- *Ben Wraith, Justin Resta, Johan Welmans from Bluestone Mines Tasmania Joint Venture, Australia for their paper Recent improvements in ore sorting at the Renison Tin Concentrator - target 1 Mt/a. This was presented at the AusIMM Mill Operators' Conference in Brisbane, Australia in June 2021.*



Renison is the largest tin producer in Australia, and the paper documents how the site overcame challenging conditions and increased processing rates by upgrading its ore through XRT Ore Sorting and other Mine to Mill and Geometallurgy practices.

Mr Lane said the well written paper provided a valuable insight into the application of ore sorting in an operating plant, describing the reasons for installation, the issues, and the cost impacts.

“The efficiency gains from coarse ore rejection prior to fine grinding are significant. This insightful publication documents the Renison experience with ore sorting and shares the value that coarse ore rejection added to the business,” he said.

The CEEC Medal Evaluation Panel also awarded two High Commendations:

2021 CEEC Medal High Commendation – Technical Research

- *SAG mill energy and wear insights derived from measuring inside the Mill, authored by Dr Paul Shelley and Eugene Davies from Molycop, Global; Jacques Olivier, Western Australian School of Mines, Curtin University; and Mark Atta Danso, Westgold Resources, Australia.*

This paper was presented at the online Comminution '21 conference.

It was the second year running that Dr Shelley's research on SAG mill optimisation has received a High Commendation in this category.

The judges noted: "It is good to see work progressing on understanding the efficiency gains that can be achieved by understanding what happens inside a mill."

"By getting real measurements from the heart of the breakage process, the paper shows how researchers, operators and suppliers can systematically investigate methods and materials to improve milling efficiency," they said.

2021 CEEC Medal High Commendation – Operations

- *Throughput improvements at the Capstone Pinto Valley Operation, a video presentation delivered at the online Comminution '21 conference.*

The work was authored by Umut Erol and Curtis Wettstein from Capstone Mining Corporation's Pinto Valley copper mine in Arizona, US, and Adrian Dance, SRK Consulting, Canada.

The judging panel said the well-presented, clear and concise presentation provided evidence of how increased fragmentation affected project efficiency and operating costs.

"The work outlines how projects can make material value improvements through diligent and well-planned work focused on optimising comminution efficiency to improve plant capacity and reduce operating costs," the judges said.

The CEEC Medal, now in its 10th year, would not be possible without the support of CEEC's industry sponsors who help fund the organisation's work in accelerating more eco-efficient mineral processing.

Special thanks to our valued sponsors and to everyone who nominated for the CEEC Medal. Abstracts from the successful papers can be viewed on the CEEC website, along with other freely available resources that catalyse industry uptake of more eco-efficient comminution and processing practices.

Nominations for the 2022 CEEC Medal are open until 31 January 2023.

Details of the application process for the 2022 CEEC Medal can be found [here](#).

Spotlight Leader Conversations

This year, CEEC launched the Spotlight Leader Conversations, a series of video interviews with leading professionals in the minerals sector.

The series examines advances, innovations and industry actions that have the potential to reduce the footprint of the extraction and processing of minerals and resources: moving us closer to net zero and the highest environmental, social, and governance (ESG) standards.

Molycop: Dr Paul Shelley, Global VP of Innovation, discussed the impact of the digital transformation that has improved the efficiency and productivity of comminution.

FLSmidth: Peter Flanagan, Senior Vice President – Global Project Sales, Executive Accounts and Key Commodities, talked about how large scale processing equipment is evolving to rise to the challenge of net zero and less water usage in processing.

Eriez: Eric Wasmund, VP Global Flotation, discussed how the energy consumption of milling can be reduced by increasing the required grind size for flotation, as well as reducing the energy for dewatering and conventional flotation.

Thermo Fisher Scientific: Scott Marshall, Field Marketing Manager, Production Process & Analytics, Scott Ferguson, Senior Global Applications Specialist and Ellen Thomson, Senior Application Specialist, talked about the latest sensor technologies for ore sorting.

ME Elecmetal: Brian Cornish, Global Lead Application Engineer, José Pablo Domínguez, General Manager, and Roberto Lecaros, Vice President, Global Marketing & Commercial Coordination, discussed how making small changes to reduce energy and steel consumption can result in big improvements in the efficiency of operations.

Magotteaux: Dr Chris Greet, Manager, Minerals Processing Research, shared why he believes mineral processing has a bright future as a key part of the energy transition.

Maptek: Eduardo Coloma, CEO, discussed how technology is making the sector safer and more sustainable, and why inclusion and diversity are important in resources sector.

CEECing Change Podcast

CEEC also launched a new podcast this year. Named CEECing Change, the podcast is for people who are interested in sustainability in the resources sector.

Each episode contains interviews with some of the people who are spearheading the resources sector's transition to energy efficiency, covering important topics such as innovation, best practice, decarbonisation, net zero, sustainability, and of course, more eco-efficient comminution.



In **Episode One**, Dean Gehring, Executive Vice President of Newmont, spoke about Newmont's work and its environmental, social and governance (ESG) targets.

In **Episode Two**, the 2020 CEEC Operations Medal winners Alan Boylston (Metso-Outotec), Isaias Arce (Metso-Outotec), Kevin Murray (formerly Newmont)

and Peter Lind (formerly Newmont) along with Mark Adams (formerly Metso-Outotec) discussed the inspiration for their Medal-winning work as well as their thoughts on the future of comminution and mineral processing.

In **Episode Three**, Peter Lind (formerly Newmont) Bryan Rairdan (Teck Resources) discussed decarbonising energy systems into mine sites, improving water efficiency, and some of the ways that important investor and community ESG and net zero expectations are being considered by technology leaders.

In **Episode Four**, Simon Hille of Eldorado Gold and Mark Adams (formerly Metso-Outotec) talked about energy and water efficiency, including ways to innovate, drivers of change, and key factors to help commercialise and scale more eco-efficient mineral processing.

In **Episode Five**, 2020 CEEC Medal winner Dr Grant Ballantyne (Ausenco) discussed exciting technologies that are key to reducing the footprint of resources extraction and processing, including how improving processing efficiency could reduce energy, water and tailings by up to 50%.

CEECing Change Podcast



In **Episode Six**, Zimi Meka, Co-Founder and CEO of Ausenco, spoke about how industry can collaborate on important ESG improvements for investors, and the importance of collaboration to solve critical whole-of-industry challenges such as energy, emissions and water impact.

In **Episode Seven**, Professor Neville Plint (Anglo American and formerly the Director of the Sustainable Minerals Institute at the University of Queensland), talked about how the resources sector can learn from success, his views on ESG, the major challenges in resources and its footprint, and the benefits of collaboration across industry.

In **Episode Eight**, Bryan Rairdan, Technical Director, Processing at Teck Resources and CEEC Director, gave his thoughts on the value that CEEC brings to leading change in industry. He also shared his vision for the next three years, for 2030 and for 2050 with net zero and ESG commitments.



In **Episode Nine**, Marc Allen, Director of engeco and CEEC Director (now CEEC Chair) talked about his work on an independent report 'Mining Energy Consumption 2021' commissioned by the Weir Group, that examines direct energy use and emissions from mine sites.

In addition, the Spotlight Leader Conversations are being released as podcast episodes to reach a broader audience.

Global Water Initiative (GWI)

Water is a critical risk for almost all resources companies and communities across the globe. According to a United Nations report, 50% of the world could be impacted by water shortages by 2050. In the US alone, 4 billion gallons are withdrawn each day by the resources sector. Meanwhile, regulations are increasing globally, and the average cost of pumping and desalinating water in Chile is US\$2-5/m³.

Resources companies are currently allocating significant effort to the compilation of water-related data for their annual Sustainability Reports. This data is generally not easy to source.

The Global Water Initiative is a project being managed by CEEC International, alongside two major research partners. The University of Queensland (UQ) - Sustainable Minerals Institute (SMI) and subsidiary International Centre of Excellence (ICE) in Chile and the University of British Columbia (UBC) in Canada will take the lead on the research. The project aims to deliver the Global Water Initiative (GWI), a free industry tool to drive industry knowledge sharing and accelerate water efficient technology uptake. The tool will empower investors, miners and METS researchers to benchmark and improve water consumption and treatment.

The GWI will build on the existing success of Energy Curves, which uses reliable data to compare comminution energy consumption at different mine sites. It will highlight the areas in the life cycle of resources operations where most water is consumed and plot consumption and recycling before and after design/operational changes in steps and across mining's value chain.

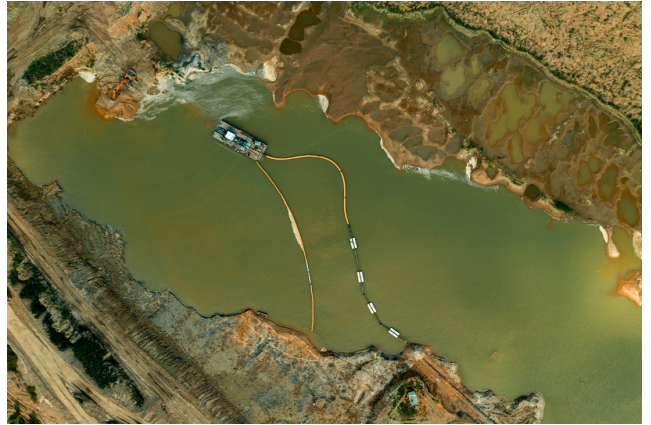
An independent Steering Committee will oversee project planning, funding, deliverables, progress, and communication of results. Existing resource operations will be used to validate the data and assumptions and will cover the range of possibilities in terms of water scarcity, water excess, seasonal inundations, evaporation, hyper-salinity, acid mine drainage (AMD) and other permutations. Experts will complete the work with independent reviewers and industry advisors to align to existing standards.

Global Water Initiative (GWI)

More than 50 industry experts took part in the first workshop in 2021; identifying some early metrics and an action plan. This was followed up with several more focussed workshops in 2022; culminating in some draft agreements and in-principle support from Foundation Funders and detailed consideration of IP handling and other legal considerations. The project will take place in multiple phases (scoping, execution and maintenance) over two years and the final GWI will be hosted on the CEEC website.

Foundation Partners for the GWI will contribute to the creation of a shared future vision while showing industry-wide leadership and corporate social responsibility and will also have an early opportunity to validate and test the tool on their own data and sites.

If you are interested in contributing, please contact CEEC's Executive President, Janine Herzig at president@ceecthefuture.org.



Income Statement

For the year ended 30 June 2022

	Note	2022 \$	2021 \$
Income			
Sponsorship		197,122	205,835
JobKeeper Subsidy		3,900	46,650
COVID-19 Cash Flow Boost		(9,346)	15,794
Interest received		46	102
Foreign exchange profit		1,159	-4,333
Total income		192,882	264,048
Expenses			
Accountancy	3	5,930	5,869
Advertising & promotion		10,726	29,390
Annual leave		(2,442)	-1,075
Audit fees	3	2,923	2,650
Bank fees & charges		167	89
CEEC expenses		2,183	1,053
Assets write off			4,675
Computer expenses		5,500	9,259
Conference and workshop expenses		1,266	5,155
Contract payments		65,592	21,229
Fringe benefits tax		7,471	7,472
Staff gifts			159
Insurance		6,453	4,467
Postage		257	197
Printing & stationery		152	959
Subscriptions			211
Superannuation		11,485	13,812
Telephone		1,115	1,103
Travel, accommodation & conference			2,104
Wages		111,324	139,917
Website design and hosting		385	1,880
Total expenses		230,487	250,581
Profit (Loss) from Ordinary Activities before income tax		(37,605)	13,467
Income tax expense		-	-
Operating profit (loss) after income tax		(37,605)	13,467

Auditor's Statement

Independent Auditor's Report

Report on the Audit of the Financial Report

Opinion

We have audited the financial report of CEEC International Ltd (the Company), which comprises the Statement of Financial Position as at 30 June 2022, the Income Statement, the Statement of Changes In Equity and the Statement of Cash Flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies, and the Directors' Declaration.

In our opinion, the accompanying financial report of CEEC International Ltd is in accordance with the Corporations Act 2001, including:

(a) giving a true and fair view of the company's financial position as at 30 June 2022 and of its performance for the year then ended; and

(b) complying with Australian Accounting Standards to the extent described in Note 1, and the Corporations Regulations 2001.

Basis for Opinion

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Report section of our report. We are independent of the company in accordance with the auditor independence requirements of the Corporations Act 2001 and the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 Code of Ethics for Professional Accountants (the Code) that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code.

We confirm that the independence declaration required by the Corporations Act 2001, which has been given to the directors of the company, would be in the same terms if given to the directors as at the time of this auditor's report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Emphasis of Matter – Basis of Accounting

We draw attention to Note 1 to the financial report, which describes the basis of accounting. The financial report has been prepared for the purpose of fulfilling the directors' financial reporting responsibilities under the Corporations Act 2001. As a result, the financial report may not be suitable for another purpose. Our opinion is not modified in respect of this matter.

Responsibilities of the Directors for the Financial Report

The directors of the company are responsible for the preparation of the financial report that gives a true and fair view and have determined that the basis of preparation described in Note 1 to the financial report is appropriate to meet the requirements of the Corporations Act 2001 and is appropriate to meet the needs of the members. The directors' responsibility also includes such internal control as the directors determine is necessary to enable the preparation of a financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, the directors are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern

Auditor's Statement

basis of accounting unless the directors either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Financial Report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of this financial report.

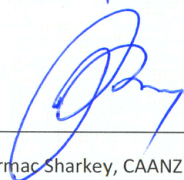
As part of an audit in accordance with the Australian Auditing Standards, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.
- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Signed on :

13 December 2022



Cormac Sharkey, CAANZ

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