HiTeMP-2 Forum: Zero Carbon High Temperature Minerals Processing

Addressing the transition of high temperature minerals processing towards net-zero-CO₂ emissions.

16 – 18 March 2020 | The National Wine Centre, Adelaide

Speaker line up featuring:



Prof Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, Germany



Dr Vincent Chevrier, General Manager, Business Development, Midrex



Ms Lina Hockaday, Senior Engineer, Mintek, South Africa



Craig Wood, CEO, Vast Solar



Prof Greg Metha, Dept. of Chemistry, the University of Adelaide



Prof Ross Garnaut, the University of Melbourne



Mr Toru Ono, Director, Nippon Steel Research Institute and Policy Advisor, Japan Iron and Steel Federation



Mr Nick Johns Hatch, Process Engineer, Hatch



Prof Ellen Stechel, Co-Director, ASU LightWorks, Arizona State University



Prof Karen Scrivener, Swiss Federal Institute of Technology



Cedric Philibert Energy and Climate Analyst



Dr Wes Stein, Chief Technologist, CSIRO



Matthew White, Senior Engineer, Hatch



Dr Lars Amsbeck, Managing Director, HelioHeat



Darren Miller, CEO, Australian Renewable Energy Agency



Mr Steve Schell CTO, Heliogen



Prof Edward Buckingham, Monash Business School



Ms Suzana Carp,-Head of EU Engagement, Sandbag



Mr David Varcoe, State Manager (NSW, ACT), Australian Steel Institute



Dr Alessio Scarsella, Director Bauxite and Alumina Technology, Outotec



Felicity Lloyd, Business Improvement and Sustainability Manager, Adelaide Brighton



Dr Keith Lovegrove, Managing Director, ITP Thermal Pty Ltd



Dr Matti Lubkoll, Project Manager, German Aerospace Center, (DLR)



Dr Warren South, Director, Research and Technical Services at Cement Concrete & Aggregates Australia



Prof Willy Kracht, Head, Department of Mining, University of Chile



Dr Kristen Jordal, Research Scientist, SINTEF



Dr Robert Trezona, Partner, IP Group and Head of Cleantech



Dr Dominique Hes, Principal Researcher, Beyond Zero Emissions



Mr André Vidal, Head of Project Support Energy, Norsk Hydro Brazil



Mr Geoff Matthews Head of Strategy, Energia Potior



Dr Habib Zughbi, Senior Research Engineer, BlueScope



Prof GJ 'Gus' Nathan, Director, Centre for Energy Technology, the University of Adelaide



Prof Jamal Chaouki, Polytechnique Montreal



Kobad Bhavnargi, Global Head of Special Projects, BloombergNEF



Dr Asem Mousa, Principal, Low Emissions Technology, BHP

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DAY 1 Monday 16 March 2020

Session 1: Global drivers

9:00am Welcome 9:05am Welcome 9:10am HiTeMP-2 9:25am Intro to Sli 9:30am (via teleconference) 9:50am (via teleconference) Feedom Welcome	d registration from the Chair to the University of Adelaide introduction and overview do nomic opportunities for trade in green, energy-intensive ddress: Australia's opportunity for carbon neutral metals upport for industry to reduce emissions	Ms Susan Jeanes, Chair CET Advisory Board, The University of Adelaide Prof Richard Hillis, Pro Vice-Chancellor (Research Performance) Prof GJ 'Gus' Nathan, Director, Centre for Energy Technology, The University of Adelaide Dr Alfonso Chinnici, Centre for Energy Technology, The University of Adelaide Mr Cédric Philibert, Energy and Climate Analyst Prof Ross Garnaut, Professor of Economics, The University of Melbourne		
9:05am Welcome 9:10am HiTeMP-2 9:25am Intro to Sli 9:30am (via teleconference) 9:50am (via teleconference) 10:20am (via teleconference) 10:40am Panel disc	to the University of Adelaide introduction and overview do nomic opportunities for trade in green, energy-intensive ddress: Australia's opportunity for carbon neutral metals	University of Adelaide Prof Richard Hillis, Pro Vice-Chancellor (Research Performance) Prof GJ 'Gus' Nathan, Director, Centre for Energy Technology, The University of Adelaide Dr Alfonso Chinnici, Centre for Energy Technology, The University of Adelaide Mr Cédric Philibert, Energy and Climate Analyst Prof Ross Garnaut, Professor of Economics, The Uni-		
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(via teleconference) 10:40am Panel disc	ipport for industry to reduce emissions			
		Mr Darren Miller, CEO, Australian Renewable Energy Agency (ARENA)		
11:00am Coffee bre	ussion			
	ak			
11:20am Chairs		Ms Susan Jeanes, and Prof Mike Young, Centre for Global Food and Resources, The University of Adelaide and Future Fuels CRC		
11:20am Global driv (via teleconference)	vers and finance opportunities for the sector	Dr Robert Trezona, Head of Cleantech, IP Group		
	ng barriers to industrial decarbonisation in the EU: enting ETS with additional supportive policies	Ms Suzana Carp, Head of EU Engagement, Sandbag		
	vers for co-investment in large scale demonstrations - gions and company hedging strategies	Mr Jason Nielsen, Director Strategic Projects, Climate-KIC		
12:20pm Panel disc	ussion			
12:45pm Lunch				
Session 2A: Sources	s for carbon-free high temperature heat – hydr	rogen, electrical and CO₂ capture		
1:30pm Introduction	on by the Chair	Prof Mike Young, The University of Adelaide		
	rogen economy outlook - can hydrogen be the molecule to lean economy?	Mr Kobad Bhavnagri, Global Head of Special Projects, BloombergNEF		
	novel technologies for production of renewable hydrogen en from water	Prof Greg Metha, University of Adelaide		
2:15pm Closing th mechanisi	e carbon cycle: Carbon dioxide removal and verifiable offset ms	Prof Ellen Stechel, Co-Director, ASU LightWorks, Arizona State University		
2:35pm Panel disc	sussion			
3:20pm Coffee bre	ak			
Session 2B: Sources	for carbon-free high temperature heat – sola	r thermal		
	on by the Chair	Prof Ellen Stechel, ASU LightWorks		
3:45pm Pathway to teleconference)	to high temperature solar thermal technology	Dr Wes Stein, Chief Technologist, CSIRO		
4:05pm 24/7 rene	wable high temperature heat utilising ceramic particles as er	Dr Lars Amsbeck, Managing Director, HelioHeat		
(via teleconference) heat carrie				
(via heat carrie teleconference)	heliostat field for carbon-free, high temperature heat	Mr Steve Schell, CTO, Heliogen		
(via heat carriculation (via teleconference) 4:25pm (via teleconference) 4:45pm CSP: cost	t-effective carbon-free heat and electricity for high temperature heat sindustries	Mr Steve Schell, CTO, Heliogen Mr Craig Wood, CEO Vast Solar		
(via teleconference) heat carrie teleconference) 4:25pm (via teleconference) 4:45pm CSP: cost (via ture proces	t-effective carbon-free heat and electricity for high tempera- ess industries			
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Session 3	3:	Iron/Steel -	techno	logy	and	research	١
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Steel Institute Commercial pathways into low-carbon steel export markets Prof Edward Buckingham, Professor of Management and Director of Engagement, Monash Business School 3.35am A China-Australia green steel industry? Becontrorsect Bectrifying industry - community drivers and transition pathways 9.55am Coffee break Panel discussion Coffee break Prof Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Helmholz Institute Freiberg for Resource Technology, German Prof. Markus Reuter, Director, Nippon Steel Research Institute, Prof. Markus Reuter, Director, Septemberg, Prof. Markus Reuter, Director, Centre for Energy Technology Panel discussion Prof. Markus Reuter, Director, Centre for Energy Technology Prof. Markus Reuter, Director, Centre for Energy Technology Prof. German Reuter for Septemberg, Prof. Markus Reuter, Director, Centre for Energy Technology Prof. German Re	8:45am	Coffee	
Steel institute Commercial pathways into low-carbon steel export markets Prof Edward Bucklingham, Professor of Management and Director of Engagement, Monash Business School 3:35am A China-Australia green steel industry? Dr. John Pye, Research School of Electrical, Energy and Materials Engineering, ANU Bickentrevoors Bickerifying industry - community drivers and transition pathways Bickentrevoors 10:15am Panel discussion Challenges of the circular economy: A process metallurgical and product design perspective Inti-Stam I	9:00am	Introduction by the Chair	
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Materials Engineering, ANU Session Electrifying industry - community drivers and transition pathways Belectrifying industry - community drivers and transition pathways Belectrifying industry - community drivers and transition pathways 10:15am Panel discussion 10:50am Coffee break	9:15am	Commercial pathways into low-carbon steel export markets	Prof Edward Buckingham, Professor of Management and Director of Engagement, Monash Business School
19.15 19.1	(via	A China-Australia green steel industry?	
11:15am	(via	Electrifying industry - community drivers and transition pathways	Dr Dominique Hes, Beyond Zero Emissions
### 14.15am Challenges of the circular economy: A process metallurgical and product design perspective for Resource Technology, Germany 14.15am (design perspective) ### 14.3am JLSF long-term vision for climate change mitigation, "A challenge towards zero-carbon steel" towards zero-carbon steel" ### 14.3am JLSF long-term vision for climate change mitigation, "A challenge towards zero-carbon steel" ### 14.5am JLSF long-term vision for climate change mitigation, "A challenge towards zero-carbon steel" ### 14.5am JLSF long-term vision for climate change mitigation, "A challenge towards zero-carbon steel" ### 14.5am JLSF long-term vision for climate change mitigation, "A challenge protection of the policy Advisor, Japan Iron & Steel Research Institute, Policy Advisor, Japan Iron & Steel Federation (JISF) ### 14.5am JLSF long-term vision for climate change mitigation, "A challenge protection of the policy of the	10:15am	Panel discussion	
Introduction by the Chair Interduction by the Chair Introduction by the Chairs Introd	10:50am	Coffee break	
towards zero-carbon steel" Policy Advisor, Japan Iron & Steel Federation (JISF) 11:55am Recent activities at BlueScope aimed at reducing ICO2 emissions by teleconference by	(via		
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12:35pm Panel discussion		Recent activities at BlueScope aimed at reducing iCO2 emissions	Dr Habib Zughbi, Senior Research Engineer, BlueScope
Session 4A: Alumina and aluminium	(via		Dr Vincent Chevrier, Midrex Technologies Inc
Session 4A: Alumina and aluminium 2:00pm Introduction by the Chair A/Prof Maziar Arjomandi, Centre for Energy Technology 2:05pm Carbon neutrality in the aluminium value chain: Bauxite to smelter grade aluminium 2:26pm Carbon neutrality in the aluminium value chain: Bauxite to smelter grade aluminium 3:225pm Alternatives to reduce Norsk Hydro's CO ₂ emissions Mr Andre Ramos Salles Vidal, Head of Project Support Energy, Norsk Hydro, Brazil 2:45pm The role of aluminium smelters in decarbonising our future Mr Geoff Matthews, Head of Strategy, Energia Potior 3:25pm Panel discussion 4:00pm Coffee break Session 4B: Cement and lime 4:20pm Introduction by the Chairs Ms Ros DeGaris, DeGaris Consulting and A/Prof Maziar Arjomandi 4:25pm Concrete challenges and opportunities Concrete & Aggregates Australia Concrete & Aggregates	12:35pm	Panel discussion	
Introduction by the Chair	1:00pm	Lunch	
Introduction by the Chair	Secsion 4A:	Aluming and aluminium	
2:05pm			
Process Grade aluminium Director Bauxite and Alumina Technology, Outotec	2:00pm	Introduction by the Chair	A/Prof Maziar Arjomandi, Centre for Energy Technology
Energy, Norsk Hydro, Brazil teleconference) 2:45pm	2:05pm (via teleconference)		
Session 4B: Cement and lime	2:25pm (via teleconference)	Alternatives to reduce Norsk Hydro's CO ₂ emissions	
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			·
	7:00 – 9:30pm		



Session 5A: Copper and other metals – strategy and pathways

8:45am	Coffee		
9:00am	Introduction by the Chair	Prof Bassam Dally, Deputy Director, Centre for Energy Technology	
9:05am (via teleconference)	Technology options to decarbonise copper	Mr Matthew White, Hatch	
9:25am (via teleconference)	BHPs strategy to decarbonise copper and nickel	Dr Asem Mousa, Principal Low Emissions Technology, BHP	
9:45am	Chilean pathway towards low-carbon copper production: Institute of Clean Technologies	Prof Willy Kracht, Head, Department of Mining Engineering, University of Chile	
9:55am (via teleconference)	The development of industrial (thermal) processes in a context of sustainability: application to phosphate industries	Prof Jamal Chaouki, Polytechnique Montreal	
10:15am (via teleconference)	Lithium - Its role in vehicle decarbonisation	Mr Nick Johns, Process Engineer, Hatch	
10:35am	Panel discussion		
11:00am	Coffee break		
11:20am	Renewable energy options for industrial process heat	Dr Keith Lovegrove, Managing Director, ITP Therma	
	B: Copper and other metals – technology options Renewable energy options for industrial process heat	Dr Keith Lovegrove, Managing Director, ITP Therma	
12:00am	Case study: Supplying solar thermal process heat at 1000C to a South African manganese sinter plant Emerging opportunities for solar thermal process heat in beneficiation of	Ms Lina Hockaday for Dr Matti Lubkoll, Project Manager, German Aerospace Center, DLR Ms Lina Hockaday, Senior Engineer, Mintek, South	
	South African mineral resources	Africa	
12:20pm	Panel discussion		
12:45pm	Facilitator summary and reflections from day three	Prof Bassam Dally, Deputy Director, Centre for Energy Technology	
1:10pm	Lunch		
Session 6	: HiTeMP-2 Outlook and Future Challenges		
2:00pm	Introduction by the Chair	Prof Bassam Dally, Deputy Director, Centre for Energy Technology	
2:05pm	Slido summaries - delegate feedback summaries from Slido software	Presented by Slido facilitators	
2:15pm	Sector Outlooks - Outlook on lowering cost of $\mathrm{CO_2}$ neutral H2/CST/electrification/CO $_2$ management	Dr Tom Campey, HiTeMP-2 Outlook and Future Challenges Facilitator	
2:45pm	Open Discussion - Outlook on Future Challenges		
3:50pm	Closing comments	Prof GJ 'Gus' Nathan	
4:00pm	Forum close		

Information and registration at https://www.adelaide.edu.au/hitemp/hitemp-2/registration

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