

# KALiNA

Clean. Energy.

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## Cleantech Sector Geothermal & Industrial Waste Heat to Power (WHP)

KALiNA Power Limited (ASX:KPO)

19 May 2022

# KALiNA Cycle® Plant virtual tour

For a **short** virtual tour of a  
KALiNA Cycle® Plant, Visit:

[www.kalinapower.com](http://www.kalinapower.com)



# Capital Overview

## Financial Profile<sup>1</sup>

Share Price	AU\$0.025
Basic Shares O/S	1.51B
Market Cap	AU\$37.8m
Debt	N/A
Cash	AU\$6.5m
Financing Options	331.4m
Incentive Options	150.6m

<sup>1</sup>As at 31 March 2022

## Top Shareholders<sup>1</sup>

### Top Shareholders

Sinalunga Pty Ltd (HNW)	7.65%
Carpe Diem Asset Mgmt (HNW)	4.37%
KEO Projects (HNW)	2.61%
Ross MacLachlan (MD & CEO)	1.79%

**Board & Management** ~6%

## Corporate Capital Raises

A\$ 13.4m 2016 – 2019

A\$8.0m @ A\$0.025 - Sept 2020

A\$10.0m\* @ A\$0.027 - Oct 2021

KALiNA Power Limited Share Price and Trading Volume



# About KALiNA Power



## Technology leader in Geothermal and Waste Heat to Power

- Superior zero emissions technology
- One of the most substantial intellectual property portfolios in the sector
- Proven across a range of industrial applications at 16 plants around the world



## Advanced with commercial near-term value drivers

- Technology platform for \$billion markets across a wide range of industries
- *Over 300 MW of projects in development*
- 64MW Saddle Hills project is Shovel Ready pending, environmental permit and updated contract pricing



## Best-in-class capabilities

- Power development team has over 150 years and 8 GW of experience
- Technical team has over 100 years of technology commercialization experience
- Major commercial and technical strategic relationships in place

Mission Statement: *To establish a profitable business in Alberta that will serve as a platform to deploy the KALiNA Cycle® to international markets and become a major player in the global WHP market*

# Compelling ESG Investment



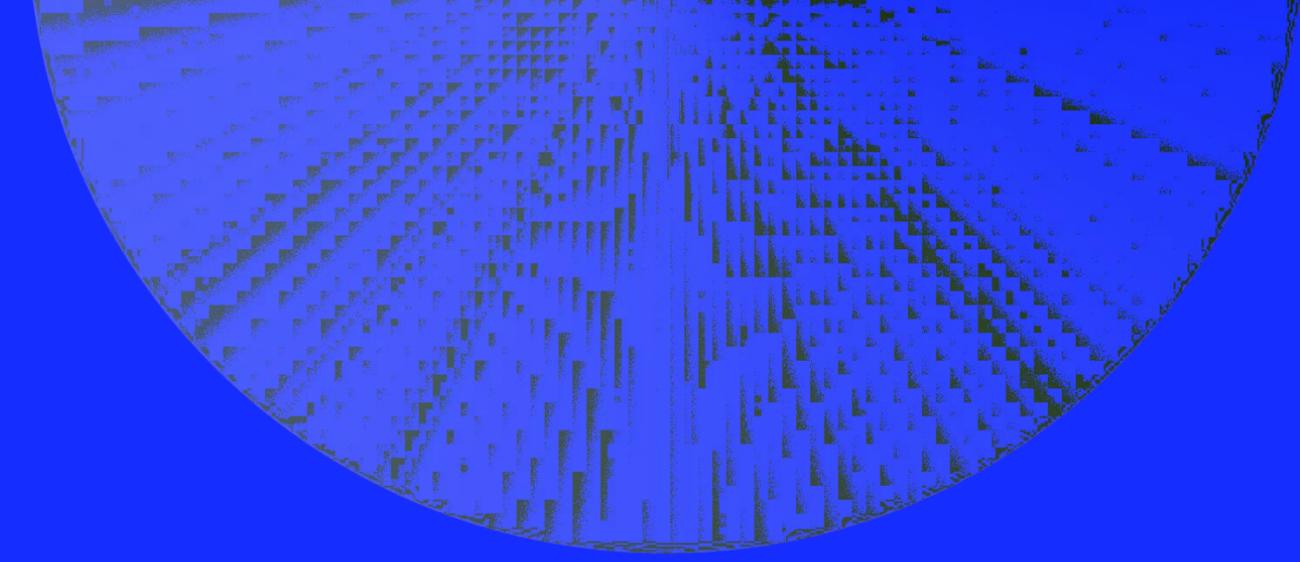
## Zero-emissions power technology for massive and diverse global markets

- *Industrial Waste Heat to Power (WHP) includes*
  - *Combined-Cycle Power Plants using Natural Gas and Hydrogen*
  - *Thermal power generation*
  - *Pipeline compression*
  - *Cement & Steel manufacturing*
  - *Oil Sands*
  - *Enhancements for LNG & Hydrogen power*
- *Geothermal Power*



## Modularizing the KALiNA Cycle in Alberta for industrial WHP and Geothermal applications

- *Over 300 MW of projects in development*
  - *Contracting underway for initial, 64MW Saddle Hills \$200 million project*
- *Licensing and joint venture business activity for various applications of the KALiNA cycle*
  - *Preparing to bid on several expected RFPs*



**“The Energy Lost in the USA from wasted heat in the utility sector is greater than the total energy use of Japan”**

US Department of Energy

# Proven Technology for a Massive Global Market

## What do Industrial Waste Heat to Power (“WHP”) technologies do?

- *Energy intensive industries such as power plants and steel plants often generate excess heat that is simply lost or wasted*
- *This waste heat is usually not hot enough to boil water to use in a conventional Steam Cycle to generate electricity*
- *However, this waste heat is often sufficiently hot to boil a “working fluid” that has much lower boiling temperatures than water*
- *This allows boiling a “working fluid” in a closed loop system that can create a vapor to drive a turbine that generates electricity*

## What is the Industrial Waste Heat to Power (“WHP”) sector?

- *The sector consists of power producers and energy intensive industries looking to reduce their carbon footprint*
  - *Organic Rankine Cycle (“ORC”) is the incumbent technology and is prevalent throughout the global power industry*
- *ORMAT (NYSE: ORA) is the incumbent ORC industry leader / MC: ~USD\$3.75 billion*
- *KALiNA Cycle® Technology has performance advantages over ORC in various applications of up to 40%*

# Superior Technology

*KALiNA Cycle® Technology has performance advantages of up to 40% over ORC  
These efficiencies open the Kalina Cycle to more industrial applications than ORC*

	ORC	KALiNA Cycle®	KALiNA Cycle® advantages
<b>Working fluid</b>	Pentane, butane, refrigerant chemicals	Variable mixture of water and ammonia	Ammonia is one of the most widely used and understood chemicals in industry today. Kalina can adjust the concentrations of ammonia and water to change the boiling temperature
<b>Adjustable working fluid</b>	✗	✓	Boiling temperature of the working fluid adjusted for variations in source temperature providing performance advantages
<b>Non-Explosive</b>	✗	✓	Working fluid is non explosive and can be installed on sensitive industrial sites. ORC requires an oil loop (adding capital costs and lowering efficiency)
<b>Working fluid is not ozone depleting</b>	✗	✓	ORC working fluids are ozone depleting. Ammonia used in the KALiNA Cycle® is not a greenhouse gas
<b>Low cost, reliable, green energy</b>	✓	✓	Sustainable process with zero emissions with similar low capital and operating costs

# Intellectual Property Portfolio

- 317 patents in the portfolio
  - Includes a range of application patents and process patents
- Initial patent portfolio updated and maintained
  - 10 individual KALiNA Cycle<sup>®</sup> patent families with over 100 individual patents filed in various countries
- Acquired Siemens IP portfolio in 2017
  - 7 patent families with over 146 individual patents filed in various countries
- Acquired IP from the estate of the late Dr Alex Kalina in 2019 for the next generation of KALiNA Cycle<sup>®</sup>
  - 30 patent families with over 50 individual patents filed in various countries
- 41 Other miscellaneous patents
- New process and applications patents continue being filed
- KALiNA's IP portfolio also covers extensive proprietary knowledge and documentation
  - Includes years of experience in process and design, across a range of industrial applications
  - Team has a sound understanding of equipment specifications and selection criteria
  - Extensive experience, documentation and knowledge for commissioning and operations



# Business Model



## Projects to be owned by KALiNA and project partners (such as Saddle Hills)

- Reimbursement to KALiNA of its project development costs
- 4% cash development fee to KALiNA's (based on total Capex)
- KALiNA to earn a Free Carried Equity Interest of approximately 10%\*
- Investment rights (not obligation) to take up to 50% of project equity



## Licensed Projects

- A royalty USD\$35,000 per MW per year is to be paid to KALiNA based on each MW of capacity using the KALiNA Cycle technology
- Licensees required to use KALiNA engineering services to ensure compliance in design and use

\*Potential to increase Free Carried Equity Interest depending on project's financial performance

# Memorandum of Understanding with Baker Hughes

- MoU marks a significant development in the company's mission to deploy applications of its high-efficiency KALiNA Cycle® technology at an industrial scale for major international markets.

## Highlights include

- Baker Hughes to be a preferred vendor of vapor turbines & turbo-expander generators for KALiNA projects
- KALiNA's Saddle Hills project to award Baker Hughes with initial vapor turbine contract
- KALiNA's Klamath Hills project to award Baker Hughes with initial turboexpander contract
- Baker Hughes to be a preferred vendor of gas turbines in the development of KALiNA's small-scale, combined cycle power packages (7-24MW) configured with the Baker Hughes NovaLT line of gas turbines, using the KALiNA Cycle® and Baker Hughes vapor turbines
- The MoU provides a framework by which both parties can provide modularized packaged solutions for markets that are in transition to zero emissions and energy efficient power

# Exceptional Team

Team has over 150 years and 9 GW of experience in power development

**Ross MacLachlan**  
*Managing Director, CEO  
Canada*

- Former Director / Investor with Pristine Power Canada's fastest growing IPP, prior to its sale to Veresen
- 40 years in technology commercialization; project finance and major US & Canadian govt funding

**Jeffrey Myers**  
*Executive Director  
Canada*

- Senior Operating Partner at Stonepeak Infrastructure Partners (US\$23B AUM infrastructure fund)
- Former Chairman & CEO and Co-founder of Pristine Power

**Peter Littlewood**  
*Director  
Hong Kong*

- Former Group Director of Operations at China Light and Power Group (CLP) Asia-Pacific region (market capitalization: US\$25.38n)

**Malcolm Jacques**  
*Director  
Australia*

- Independent Technical and Regulatory Consultant
- Consulted for BP Ventures (UK), MIT (USA), and Strategic Research Foundation

**Timothy Horgan**  
*Executive Director  
Australia*

- Lawyer and business executive with international experience in mining, energy and licensing; Including the Gillette Company and Universal Coal Plc

**Nigel Chea**  
*President Greater China  
Hong Kong*

- Former COO and President – Greater China of Meiya Power overseeing its portfolio of 17GW or projects

**Stephen White**  
*Senior Industry Advisor*

- Former CEO of Veresen Inc; pipeline, midstream & gas processing assets, sold to Pembina in 2017 for \$9.7 billion

**Kevin Wallace P. Eng.**  
*Technology Development &  
Commercialization*

- International authority on waste heat to power & geothermal power
- Former senior engineering & global business development executive for 23 years with internationally acclaimed Power Engineers
- Involved with 750MW of new geothermal project deployment

**Bob Rosine**  
*Alberta General Manager*

- Chief Operating Officer (Oil & Gas) at Grafton Asset Management
- Former Chief Operating Officer at Pipestone Energy

**Ken Spinner**  
*EPC Management*

- Former Co-founder & Vice President of engineering & Construction of Pristine Power and its acquiring company Veresen
- Over 28 years of experience managing EPC Power projects

**Julia Ciccaglione**  
*Regulatory & Government*

- Former Co-founder & Vice President of Regulatory & Environment at Pristine Power and its acquiring company Veresen
- Environmental scientist with over 20 years experience in regulatory, impact assessment, and permitting for power projects

**Geoff Scott**  
*Analyst*

- Former analyst with Westcoast Power and Pristine Power
- Over 30 years of experience in equity financed economic modelling for large scale utility projects

# KALiNA's Commercial Priorities

## 64MW KALiNA Energy Centre - Saddle Hills

Effective De-Risk Strategies in place

- Power Engineers Incorporated contracted as the project's Owner's Engineer
- Gas turbine by world leading Siemens Energy
  - Proven SGT-600 selected as gas turbine
  - Performance and delivery guarantees
  - Long-Term Service Agreement
- Vapour Turbine by industrial equipment leader Baker Hughes
  - SNC1-2 Vapour Turbine Generator Module
  - Performance and delivery guarantees
  - Long-Term Service Agreement
- Project being delivered under fixed price contracts
- Pursuing gas reserves to reduce costs and stable supply inputs
- Standardized, repeatable, modular design of combined cycle
  - Performance and delivery guarantees
  - Limits in-field labour time and costs
  - Improves quality control
  - Reduced construction schedule
- Utility Connections
  - Within 3 km of both gas and electrical interconnections
  - Limited cost, regulatory, and schedule risk
- Shovel Ready; pending environmental permit and updated pricing

Best-in-Class, Distribution Connected  
Combined Cycle Efficiency

**KALiNA**  
Clean. Energy.

KALiNA Energy Centre – Saddle Hills



**KALiNA Energy Centre  
Saddle Hills**

# Commercial Arrangements for Saddle Hills

**SIEMENS**

- SGT-600 gas turbine vendor. Over 350 SGT-600 sold, 10 million operating hours
- Performance and delivery guarantees with long-term services agreement

**Baker Hughes** 

- SNC1-2 Vapour Turbine Module
- Performance and delivery guarantees with long-term services agreement



- KDP's Owner's Engineer; internationally renowned design and power industry firm
- 30 years experience with KALINA Cycle® Technology

**ENERFLEX**

- Standardized Modular Design
- Fabrication of modules with performance and delivery guarantees

 **TC Energy**

- Natural gas interconnection
- NGTL main line 2.7 km from site

**ATCO** *Electric*

- Electrical Interconnection
- Distribution Substation 1km from site

# KALiNA's Commercial Priorities

## Gas Turbines

- Finalizing initial 10 MW module to produce zero-emissions power from the waste heat generated from gas turbines
- 64 MW combined cycle power block is designed to address a market of over 800 MW of distributed power generation by 2035 to meet the requirements in Alberta as forecasted by EDC Associates
- Engineering for the 10MW KALiNA Cycle® module at Saddle Hills is directly applicable for use on gas turbines used with gas pipeline compressor stations
- KALiNA estimates market of +1,000 MW of WHP from Canada's 4,600 MW of pipeline compressor stations
- KALiNA is preparing to participate in a competitive RFP for WHP on multiple gas pipeline compressor stations. KALiNA intends to marshal resources and partners in order to properly bid on this opportunity



# KALiNA's Commercial Priorities

## Hydrogen & LNG

- Production of Hydrogen and LNG are generally energy intensive processes which present waste heat to power opportunities for the KALiNA Cycle<sup>®</sup>
- In addition, the unique characteristics of the KALiNA Cycle<sup>®</sup> can provide improved operational efficiencies in the liquification, transportation and resulting regasification of Hydrogen and LNG
- KALiNA has developed preliminary engineering and intends to commercialize these important applications of the KALiNA Cycle<sup>®</sup> with qualified industrial partners



# KALiNA's Commercial Priorities

## Oil Sands

### Steam-Assisted Gravity Drainage (SAGD)

- It is estimated that the low temperature heat resources within the 29 in-situ oil sands extraction sites in Western Canada represent a potential of 2,000 MW
  - SAGD related applications represent \$billion international markets for the KALiNA Cycle® technology
- KALiNA is filing for grant funding to design and construct a 4MW KALiNA Cycle® modularized plant for a global energy company which is seeking to improve energy efficiency in their oil sands extraction
  - A successful project may lead to up to 80MW of KALiNA Cycle® deployment
  - The grant process, commercial scope, and arrangements with the referenced energy company are expected to be determined in the coming months



# KALiNA's Commercial Priorities

## Geothermal

- KALiNA and Power Engineers have engineered a 10 MW geothermal plant using the KALiNA Cycle®. The preliminary engineering and design case will be used to procure a cost estimate for the fabrication of Geothermal modules at various scales
- This will enable KALiNA to develop its own projects and effectively bid on projects being developed by other geothermal power developers
- The Geological Survey of Canada has identified over 5,000 MW of potential electricity generation from warm sedimentary basins in Western Canada. The KALiNA Cycle® is ideally suited for these low temperature geothermal resources
- KALiNA is preparing to participate in a competitive RFP bidding process for geothermal projects in Western Canada and Australia.
- KALiNA has reactivated development plans for the Klamath Hills 10MW geothermal project in Oregon in light of improved power pricing opportunities with corporations contracting for carbon offsets
  - As part of the process, KALiNA has increased its stake in the Klamath Hills project holding company to 50.1%



**“US Geothermal capacity is anticipated to grow to 28% of electricity generation reaching 18 GW by 2024”**

US Department of Energy

# Conclusion

- Exceptional team with high quality partners
- Superior and proven zero emissions technology
- Technology platform for billion dollar markets across a wide range of industrial sectors
- Well-advanced commercial pipeline with multiple near term value drivers
- Unprecedented government and institutional support for Cleantech
- Pursuing dual listing on Toronto Exchange