

# KALiNA

Clean. Energy.

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## Cleantech Sector Investment Opportunity in Industrial Waste Heat to Power (WHP) and Geothermal Power

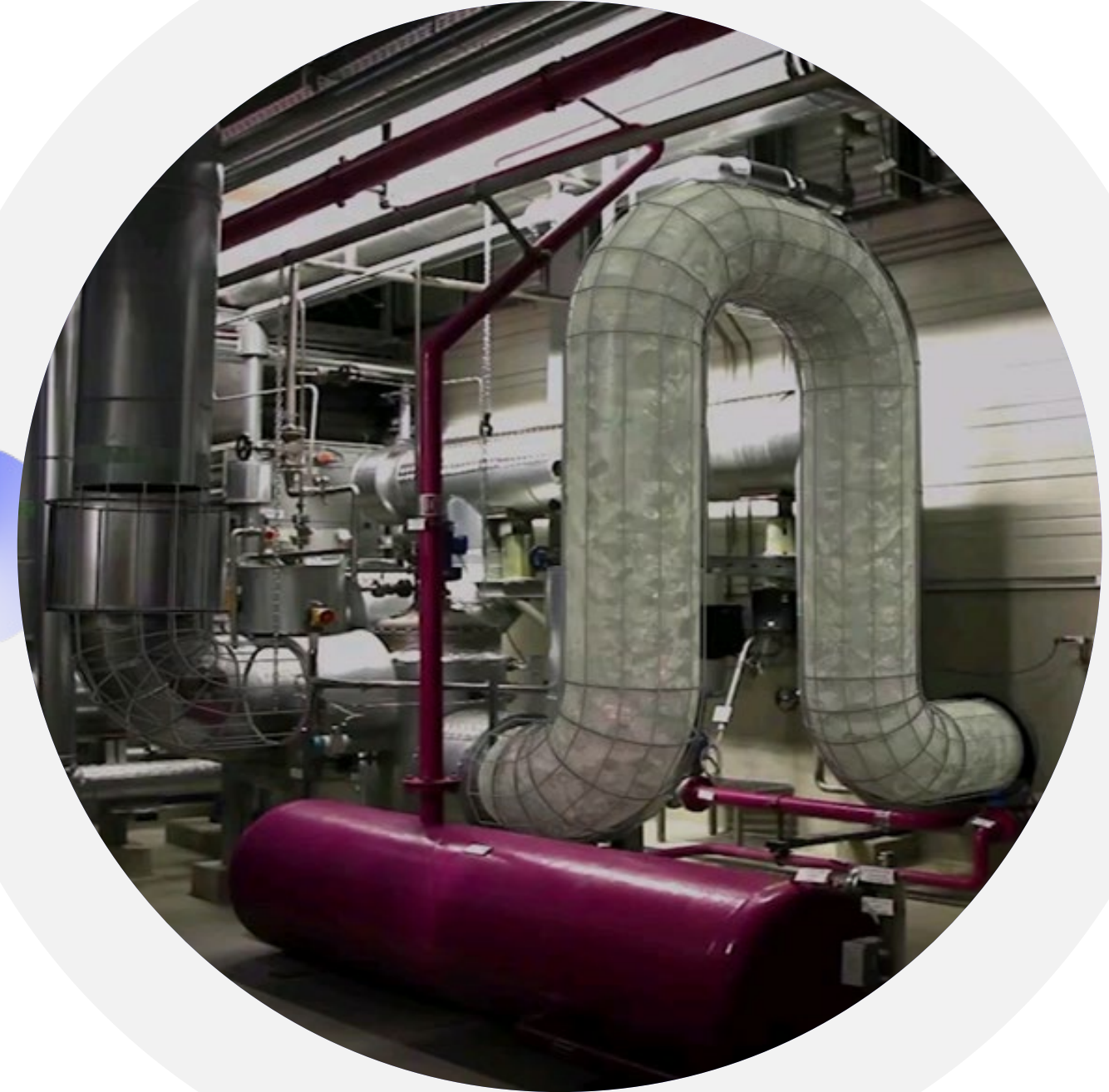
KALiNA Power Limited (ASX:KPO)

22 September 2021

# KALiNA Cycle® Plant virtual tour

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

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





# Disclaimer

- This presentation contains certain forward-looking statements that have been based on current expectations about future acts, events and circumstances
- These forward-looking statements are, however, subject to risks, uncertainties and assumptions that could cause those acts, events and circumstances to differ materially from the expectations described in such forward-looking statements
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**“Climate change is the next major mega-trend,  
and we believe it represents the biggest  
investment opportunity since the internet”**

Munro Partners (\$5 billion Global Investment Fund) – Source AFR



# Capital Overview and Corporate Leadership

Financial Profile <sup>1</sup>		Top Shareholders <sup>1</sup>		Corporate Capital Raises	
Share Price	AU\$0.031	<b>Top Shareholders</b>		AU\$ 13.4m 2016 – 2019	
Basic Shares O/S	1.14B	Sinalunga Pty Ltd (HNW)	7.7%	AU\$8.0M @ AU\$0.025 - Sept 2020	
Market Cap	AU\$35.5M	Carpe Diem Asset Mgmt (HNW)	5.8%		
Debt	N/A	KEO Projects (HNW)	3.1%		
Cash	AU\$0.6M	Ross MacLachlan (MD & CEO)	2.4%		
Financing Options	331.4m	<b>Board &amp; Management</b>	<b>~9%</b>		
Incentive Options	150.6m				

<sup>1</sup>As at 3 September 2021

KALiNA Power Limited Share Price and Trading Volume



Name & Position	Biography
<b>Ross MacLachlan</b> MD & CEO Canada	<ul style="list-style-type: none"> <li>Former Director / Investor with Pristine Power Canada's fastest growing IPP, prior to its sale to Veresen)</li> <li>40 years in technology commercialization; project finance and major US &amp; Canadian govt funding</li> </ul>
<b>Jeffry Myers</b> Exec - Director Canada	<ul style="list-style-type: none"> <li>Senior Operating Partner at Stonepeak Infrastructure Partners (US\$23B AUM infrastructure fund)</li> <li>Co-founder - former Chairman, CEO of Pristine Power</li> </ul>
<b>Peter Littlewood</b> Director Hong Kong	<ul style="list-style-type: none"> <li>Former Group Director of Operations at China Light and Power Group (CLP) Asia-Pacific region (market capitalization: US\$25.3Bn)</li> </ul>
<b>Malcolm Jacques</b> Director Australia	<ul style="list-style-type: none"> <li>Independent Technical and Regulatory Consultant</li> <li>Consulted for BP Ventures (UK), MIT (USA), and Strategic Research Foundation (AUS)</li> </ul>
<b>Timothy Horgan</b> Exec - Director Australia	<ul style="list-style-type: none"> <li>Lawyer and business executive with international experience in mining, energy and licensing: Including the Gillette Company and Universal Coal Plc</li> </ul>
<b>Stephen White</b> Sr. Industry Advisor Canada	<ul style="list-style-type: none"> <li>Former CEO of Veresen Inc; pipeline, midstream &amp; gas processing assets: sold to Pembina in 2017 for \$9.7 billion</li> </ul>
<b>Nigel Chea</b> Pres. Greater China Hong Kong	<ul style="list-style-type: none"> <li>Former COO and President – Greater China of Meiya Power overseeing 17GW Portfolio</li> </ul>

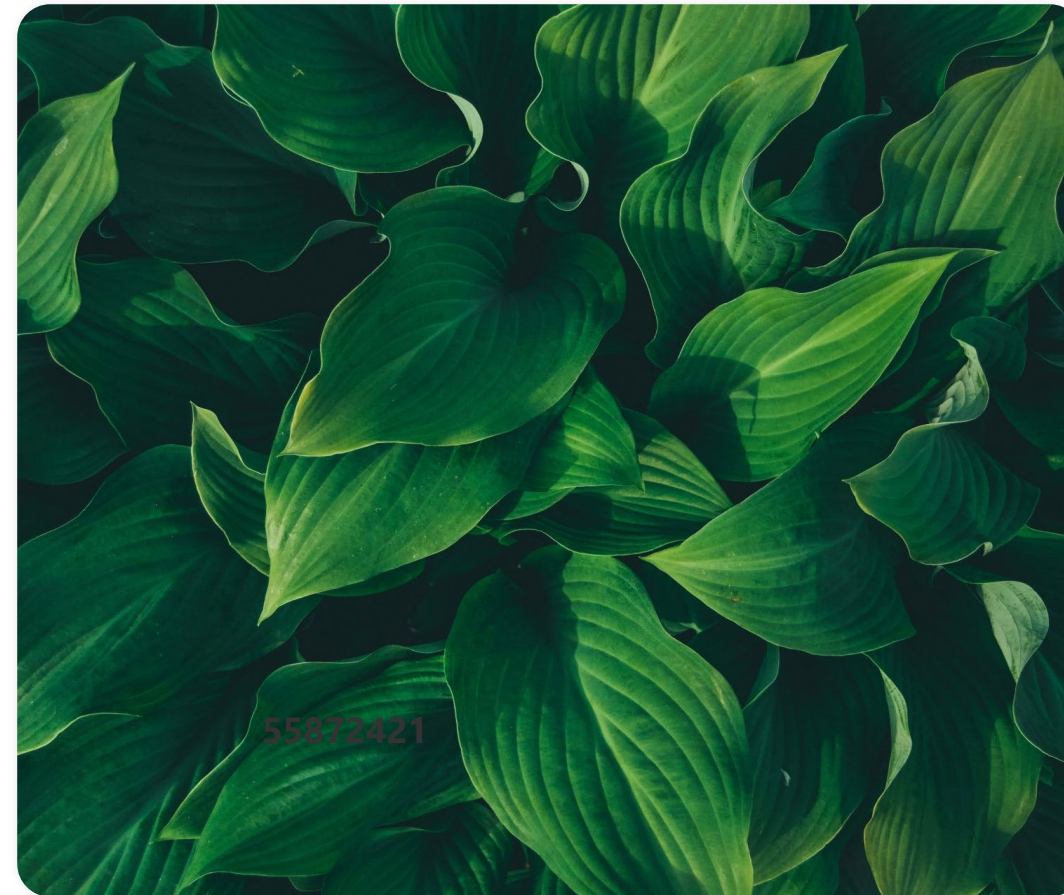


# About KALiNA Power



## 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

- Over 300 MW of projects in development
- Targeting FNTF for initial Saddle Hills \$200 million project in Q4 2021
- Technology platform for \$billion markets across a wide range of industries



## Best-in-class capabilities

- Power development team has over 150 years and 8 GW of experience
- Technical team has ~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:*
  - *Thermal power generation*
  - *Combined-Cycle Power Plants using Natural Gas and Hydrogen*
  - *Pipeline compression*
  - *Cement production*
  - *Steel manufacturing*
- *Geothermal Power*



## Modularizing the KALiNA Cycle in Alberta for priority industrial and geothermal applications

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



# Multiple near-term value drivers and well-advanced project pipeline

- Pursuing a dual listing on Toronto Exchange to facilitate trading and access to North American capital markets
- Flagship 64MW Saddle Hills Project targeting Full Notice to Proceed ('Fntp') in Q4 2021
- Pursuing ownership of gas reserves to enhance KALiNA's portfolio of projects by providing lower fuel costs and stable, secure long-term access to natural gas
- Develop terms and framework of ownership and operation with globally recognized energy company for initial 4MW KALiNA Cycle® Plant (with potential for up to 80MW) to improve energy efficiency in oil sands extraction
- Preparing to participate in a number of Request for Proposals (RFPs) including:
  - significant WHP opportunity at gas pipeline compressor stations in Western Canada
  - large geothermal project in Western Canada
- Reactivating 10MW Klamath Hills Oregon geothermal project by contracting Carbon Offsets with major corporations



# Government support for Cleantech is unprecedented



## USA

- *Energy Act of 2020 authorizes US\$35Bn in clean energy spending*
  - *The most significant action to reduce greenhouse gas emissions in the US in over a decade*
  - *Bill includes crucial tax eligibility for Waste Heat to Power (“WHP”) – now eligible for 30% tax credits*
- *President Biden’s Energy Plan proposes additional US\$400Bn in clean energy spending outlining a “carbon pollution-free power sector by 2035”.*



## Canada

- *Federal legislation increases Carbon Tax from \$50 to \$170 per metric tonne by 2030*
  - *Upheld by Supreme Court – cements the green agenda*
  - *This week’s Federal election provides endorsement of Liberal governments environmental program*
  - *Voters overwhelmingly support this level of carbon pricing for industry*

**“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



# Business Model



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

- Reimbursement to KALiNA's of 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

# Exceptional Project Management Team

**Ray McKay P.Eng. MBA**  
General Manager

- Over 35 years of experience in thermal and renewable energy development, construction, and operations / Over \$3B in generation
- Former Vice President, Business Development at ENMAX Corporation

**Ken Spinner P.Eng.**  
EPC Management

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

**Julia Ciccaglione**  
Regulatory & Government

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

**Mark Mirolli**  
Chief Technology Officer

- The leading international expert on the KALiNA Cycle® system with 35 years of experience in power generation design and construction
- Former Director of Technology Development for ABB Combustion Engineering, responsible for utility steam generation technology

**Fred Scott P.Eng.**  
Bus Development

- 33+ years of experience in the energy industry including positions at Imperial Oil, Westcoast/Engage Energy, EPCOR, and Pristine Power
- Canadian upstream drilling and completions engineering, marketing of US structured gas and power transactions

**Geoff Scott P.Eng. MBA**  
Analysis

- 30+ years energy industry experience / Westcoast Power and Pristine Power
- Extensive experience in equity financed economic modelling for large scale utility projects

**Bob Rosine**  
Gas Development

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

**Ramazan Okten**  
Heat Transfer Specialist

- 30+ years in heat exchanger design processes and global marketing
- Internationally recognized for innovation and intellectual property development for energy efficiency and industrial efficiency



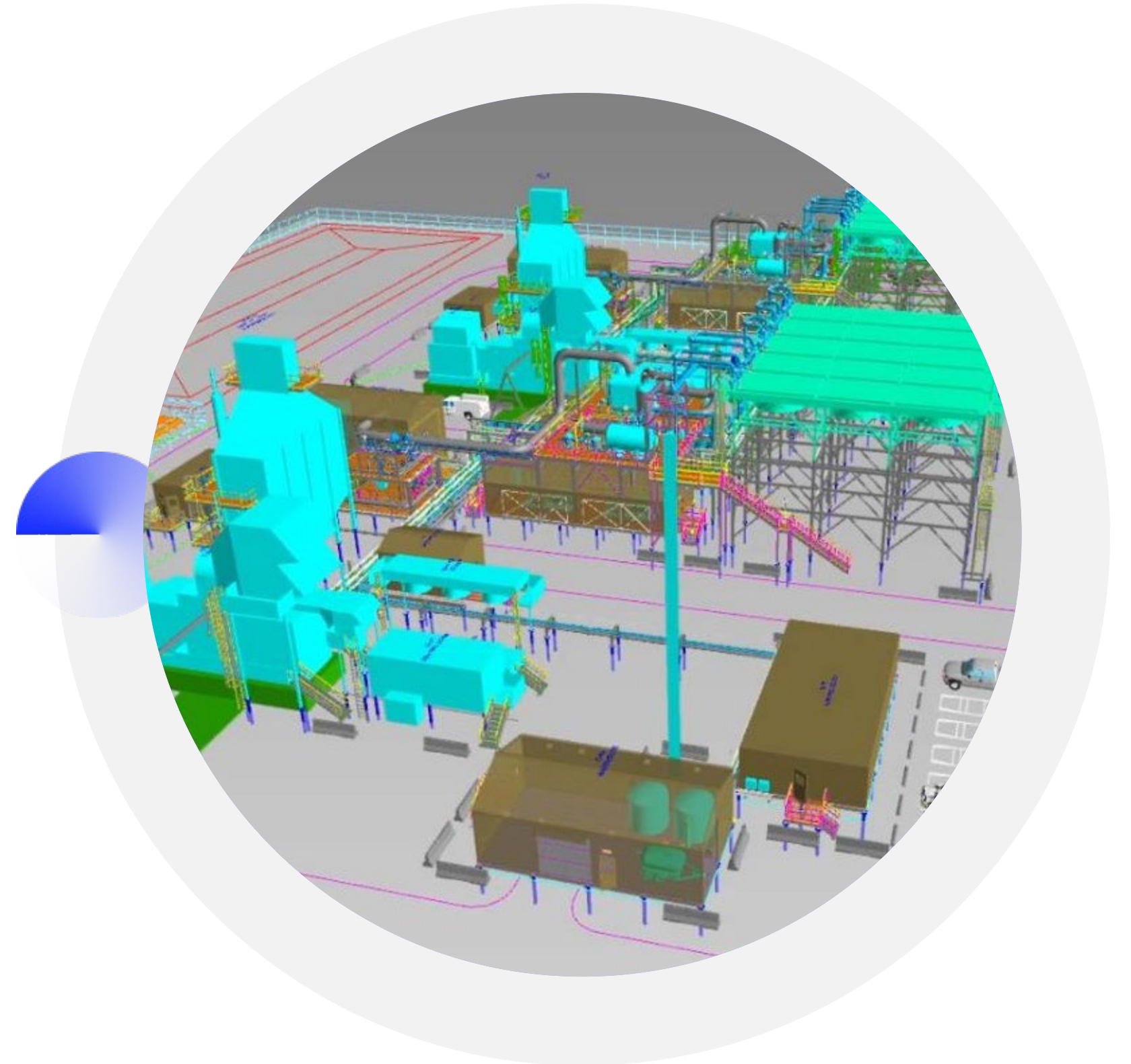
# Commercial Priorities

## Priority #1: Saddle Hills Project

### KALiNA Energy Centre - Saddle Hills, Alberta

- 64 MW modularized small-scale combined cycle power plant
- Capex \$214M – projected double-digit unlevered returns
- Full Notice to Proceed ('FNTP') targeted for Q4 2021
- Commercial operation targeted for H1 2024
- Effective De-Risk Strategies in place:
  - Power Engineers providing Owner's Engineering Support
  - Project delivered under fixed price contract by Enerflex
  - Utility Connections
    - Within 2 km of both gas and electrical interconnections
    - Limited cost, regulatory, and schedule risk

Saddle Hills is the first of several projects representing over 300 MW in development



# Saddle Hills Project - Best-in-Class Efficiency

**64 MW: Two x 32 MW Power Blocks configured with:**

## **22 MW Efficient and Reliable Gas Siemens SGT-600**

- *Reliable, efficient, and excellent in-service track record*
- *Low life cycle cost with high lifetime availability*
- *Siemens' performance guarantee & life cycle maintenance*
- *Best in Class NOx emissions*
- *Capable of Operating with blend of Hydrogen and Natural Gas*

## **10 MW Zero-Emissions KALiNA Bottoming Cycle**

- *KALiNA Cycle® captures waste heat from Siemens SGT-600 to generate additional 10 MW of zero-emissions power*
- *Increased power plant efficiency of approximately 40% over ORC for this scale and application*

## **Modularized design**

- *Standardized, repeatable, with performance guarantees*
- *Limits in-field labor time and costs - Improves quality control*
- *Reduces construction schedule*





# Saddle Hills Project – Strategic Relationships In Place

## ENERFLEX

**Enerflex: (EFX:TO)** Contracted to deliver cost effective, modularization of KALiNA Cycle plants

- Strategic interest in working with KALiNA in Alberta, North America and internationally
- Detailed engineering and cost estimating underway with the goal to provide a lump-sum turnkey EPFC contract



**Power Engineers Incorporated:** KALiNA's Owner's Engineer and process design reviewer

- Global consulting engineering firm: ranked 4th in the Power Sector by Engineering News Record in 2019
- Experience in previous KALiNA Cycle projects and proposals; selection of key vendors and confirmation of cost estimates

## SIEMENS

**Siemens Energy:** One of the world's leading energy technology companies

- KALiNA's distributed power generation projects in Alberta to be configured with Siemens Energy gas turbine technology and a KALiNA Cycle® power module that generates emissions-free power from the gas turbine's waste heat.

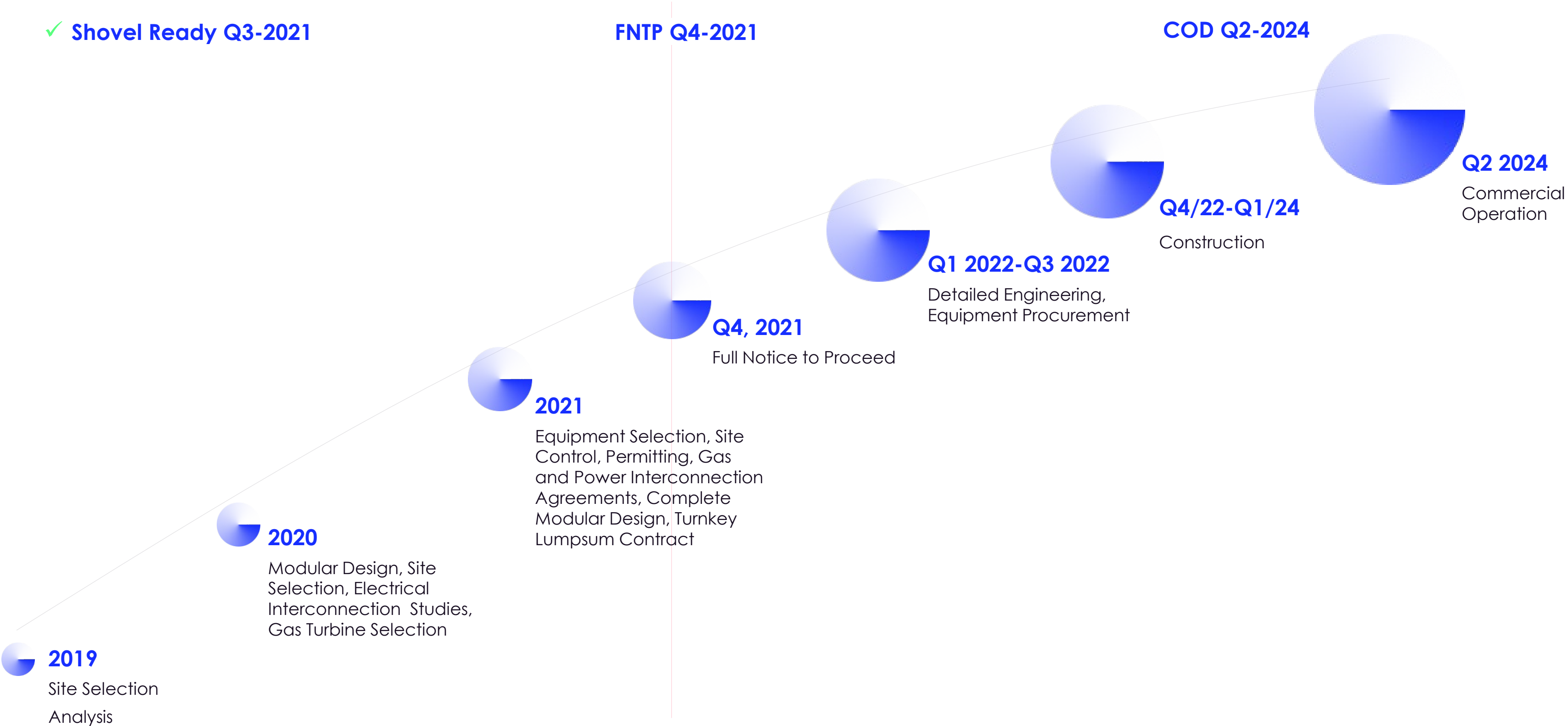


**Akira Partners:** KALiNA's Alberta Program Project Funding Partner based in Calgary

- Partnership Agreement with Akira having right of first refusal to provide project equity and arrange debt for KALiNA projects in Alberta
  - Akira receives a priority on various risk adjusted rates of return, depending on the contracted structure of each project, with waterfall returns to KALiNA

# Saddle Hills Project – Schedule

✓ Shovel Ready Q3-2021





# 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



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

US Department of Energy



# 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 a large, geothermal project in Western Canada. KALiNA intends to marshal resources and partners in order to properly bid on this opportunity
- 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%



# 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.





# 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.



# Conclusion

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



# Appendix

- **Intellectual Property Portfolio**
- **Compelling Cleantech**
- **KALiNA Cycle®** - Commercially Deployed Globally Over 20 years

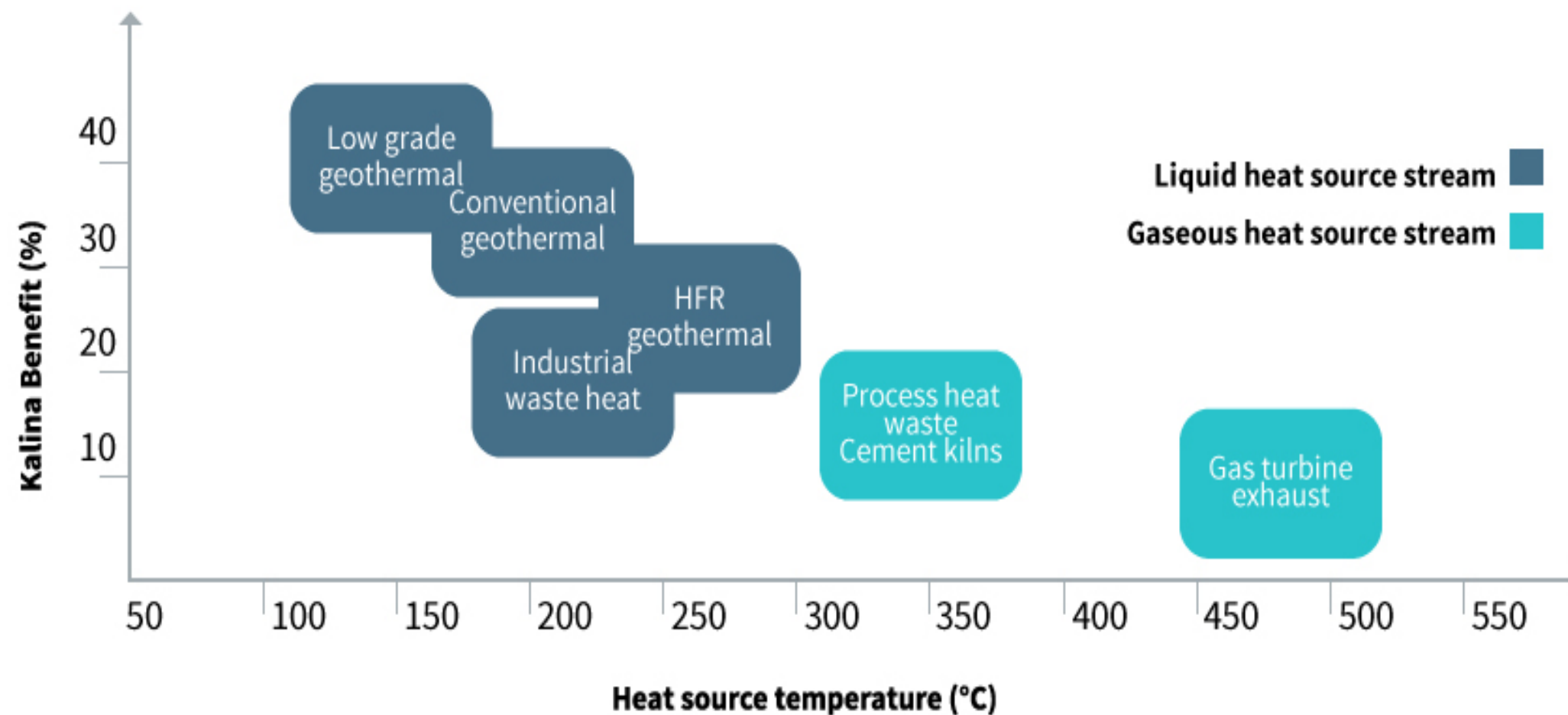
# Intellectual Property Portfolio

- 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



# Compelling Cleantech

- The Kalina Cycle<sup>®</sup> is the most significant improvement in the steam power cycle since the advent of the Rankine Cycle in the mid 1800s.
- The Kalina Cycle<sup>®</sup> utilizes an ammonia-water mixture as a working fluid to improve system thermodynamic efficiency and provide more flexibility in various operating conditions.
- The Kalina Cycle<sup>®</sup> can improve power plant efficiency by up to 40% over the Rankine Cycle depending on the application. As plant operating temperatures are lowered, the relative gain of the Kalina Cycle<sup>®</sup> increases in comparison with the Rankine Cycle and the Organic Rankine Cycle (ORC).



# KALiNA Cycle<sup>®</sup>

## Commercially Deployed Globally Over 20 years

### Successful Projects

- ✓ Compliance with KALiNA's engineering design and equipment specifications
- ✓ Projects that utilized KALiNA's engineering team and world class EPC firms

### Key Focus for Future Projects

- ✓ Modularization of the KALiNA Cycle for various industrial and Geothermal applications
- ✓ Modularization includes selecting major equipment vendors to provide high quality, standardised equipment for high performance, shorter lead times and better inventory management
- ✓ Strict compliance with KALiNA's engineering design and equipment specifications
- ✓ Project delivery through world class EPC firms

### Sumitomo Metals (Steel)



- Location: Japan
- EPC partner: Ebara Corporation
- Commissioned: 1999
- Capacity: **3.5 MWe**
- Steel mill: 98°C water
- **Operated trouble-free with an availability above 96%**
- Performance tests conducted by Japan's MITI<sup>1</sup> confirm that the **performance exceeds the design specifications**

### Fuji Oil (Petrochemical)



- Location: Japan
- EPC partner: Chiyoda Engineering
- Commissioned: 2005
- Capacity: **4.0 MWe**
- Petrochemical plant: 116°C condensing overhead vapours
- **Annual availability of 97%**
- Able to **perform continuously, safely and reliably, despite fluctuating conditions**

### Unterhaching (Geothermal)



- Location: Germany
- EPC partner: Siemens
- Commissioned: 2009
- Capacity: **3.4 MWe**
- Geothermal power plant: 120°C thermal water
- Dynamic system that responds to changing heating requirements and environmental conditions
- **System allows for 100% constant use of thermal water**
- **Exceptional solution for utilizing low temperature geothermal resource to deliver heating and power**



**“Successful reference plants confirm that the technology is fundamentally efficient, reliable and safe...across a range of heat source parameters including those often found but not utilised in common industrial settings.”**

Technip Stone & Webster report on the KALiNA Cycle®