

IGNITE

MODULAR CARBON CAPTURE SOLUTIONS: DELTA CLEANTECH'S GAME-CHANGING TECHNOLOGY

Q & A With Deh Tai LP and Tu Deh-Kah Geothermal

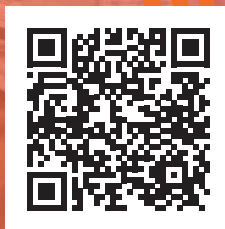
Converting Waste Into Value

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FOREWORD

BRENT E. DOUZIECH, CHIEF OPERATING OFFICER, SCOVAN

The energy industry stands at a critical crossroads, confronting both challenges while presenting extraordinary opportunities. As companies navigate the path toward sustainability, they must balance the demand for energy security with the urgency of environmental responsibility. This shift brings a host of complexities from diversification, resource constraints, regulatory impacts, and labor shortages, to name a few.

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We are truly at a
Crossroads of Energy.

”

This issue of IGNITE, aptly themed "**Crossroads of Energy: Transition and Integration,**" explores how traditional energy companies are integrating new technologies and approaches to adapt to this evolving landscape. From carbon capture and renewable natural gas (RNG) to geothermal advancements and lithium extraction, the articles in this edition highlight strategic responses to the industry's most pressing challenges. Through these stories, we see how the industry is transforming, innovating, and preparing for a sustainable future.

At Scovan, we are also embracing this transformation. When I joined in late 2023, I committed to our core value of **Disruption for the Better**. This commitment, combined with insights from our team, has shaped what we call **Scovan 2.0** – an evolution of our structure and operating systems, guided by the key themes of focus and execution. These principles are key to our approach as we balance the demands of the energy transition with the evolving needs of our clients.

Scovan 2.0 is about more than internal change. We are optimizing our structures to boost collaboration, streamline workflows, and create a culture **where every** Scovanite can excel. By strengthening our operational foundation, while investing in new disruptive technologies, we are ensuring that we stay agile and responsive to the industry's changing needs. This dual approach enables us to meet our clients' expectations today while preparing for tomorrow's energy landscape.

I invite you to explore the insights within this edition of IGNITE, where industry leaders discuss how they are driving progress and forging a path toward a more sustainable future. Scovan is proud to be part of this journey, both within our organization and alongside our clients and partners. ■



LAND ACKNOWLEDGEMENT

In the spirit of respect, reciprocity and truth, we honour and acknowledge the traditional Treaty 7 and Treaty 6 territories in which our Scovan community lives and works.

Treaty 7 territory—the traditional and ancestral territory of the Blackfoot Confederacy: Kainai, Piikani and Siksika as well as the Tsuu T’ina Nation and Stoney Nakoda First Nation. Treaty 6 territory—the traditional and ancestral territory of the Cree, Dene, Blackfoot, Saulteaux and Nakota Sioux.

We acknowledge that this territory is home to the Métis Nation of Alberta, Regions 2, 3 and 4 within the historical Northwest Métis homeland. Finally, we acknowledge all peoples – Indigenous and non – who live, work and play on this land, and who honour and celebrate this territory.

As Scovan progresses our ESG plan, we renew our commitment to building sustainable, respectful relationships with Indigenous communities wherever we operate.



MODULAR CARBON CAPTURE SOLUTIONS:

JEFF ALLISON, PRESIDENT AND CEO, DELTA CLEANTECH

DELTA CLEANTECH'S GAME-CHANGING TECHNOLOGY

As industries around the world face mounting pressure to reduce their carbon emissions, Delta CleanTech is leading the way with an innovative, modular carbon capture solution that makes emission reduction economically viable at any scale. With a proven track record of performance and reliability, Delta's EM3 CO₂ capture technology addresses key pain points in carbon capture, offering scalable, cost-effective solutions for a wide range of industries—from energy production to industrial manufacturing.

The Power of Modularity: Scalable Carbon Capture for Every Industry

What sets Delta's CO₂ capture technology apart is its modular design, which allows clients to scale their carbon capture solutions to meet their specific needs—whether they are small operations or large-scale industrial emitters. Unlike traditional carbon capture systems that are custom-built for each project and require massive capital investments, Delta's modular technology can be implemented quickly and cost-effectively. This flexibility makes it an ideal choice for companies looking to reduce their carbon footprint without the burden of expensive, space-intensive infrastructure.

The modular design means that Delta's systems can be deployed at a range of capacities, from 10 TPD (tonnes per day) up to 1000 TPD, allowing companies to start with smaller, more affordable installations and scale up as needed. This approach significantly lowers the initial capital expenditure (CAPEX) and reduces installation time, providing a more accessible entry point for industries that have previously struggled with the high costs of large-scale carbon capture projects.

Proven Technology: Commercial Deployment and Real-World Performance

One of the most compelling aspects of Delta CleanTech's offering is that its technology is not just a concept or a pilot—it is commercially deployed, operational, and exceeding process guarantee

commitments. Delta's CO₂ capture systems have been installed and are running successfully in real-world applications, with performance guarantees being met and exceeded. With CO₂ recoveries of up to 98%, Delta's technology has proven to be both highly effective and reliable. This commercial deployment is particularly timely as industries look for proven solutions to meet new emissions mandates, such as the Canadian government's recently announced 35% emissions reduction target for the oil and gas sector by 2030. Delta's track record provides clients with confidence in investing in a system that not only delivers tangible results but is also aligned with regulatory goals.

In contrast to many of its competitors, Delta's technology has moved beyond the laboratory or test phase. It has been deployed and is performing as promised, making it one of the few commercially proven solutions in the market. The real-world performance of Delta's systems underscores the accuracy of their modeling software and the robustness of their technology, reinforcing their commitment to delivering cost-effective, high-efficiency carbon capture at all scales.

Efficiency, Cost Savings, and Extended Solvent Life with PurificationRX Reclaimer®

A key feature of Delta's technology is the PurificationRX Reclaimer®, a patented system that ensures the longevity of the solvents used in the capture process. In traditional carbon capture systems, solvents degrade over time, requiring frequent replacement and increasing operational costs. Delta's Reclaimer® system continuously removes impurities, ensuring that solvents remain chemically pure and efficient for longer periods. This reduces the frequency of solvent replacement and lowers overall operating expenses (OPEX). By maximizing the use of each solvent batch, Delta's technology delivers substantial cost savings over the life of the system—further reinforcing the economic viability of their modular solution.

Supporting the Advancement of Carbon Capture: Scovan and Delta CleanTech

Scovan and Delta CleanTech are actively supporting one another in the development and advancement of carbon capture projects. Leveraging Scovan's expertise in engineering, design, and project execution alongside Delta's cutting-edge carbon capture technology, this collaboration brings scalable, modular, and commercially proven solutions to industries seeking accessible and economically viable paths to emission reduction.

Together, Scovan and Delta are helping companies around the world implement cost-effective and efficient carbon capture systems. By providing adaptable and reliable solutions, they are empowering industries to meet regulatory targets and transition toward a more sustainable future. Through this shared effort, Scovan and Delta are setting new standards for modular and scalable carbon capture technology that can be deployed at any scale, anywhere in the world. ■



CONVERTING WASTE INTO VALUE

OLEH WOWKODAW, PRESIDENT & CEO, BLUE EDEN CLEANTECH INC.

Blue Eden and partners address the shortage in supply of critical and strategic resources needed for the green economy by facilitating reuse of critical resources, including metals, chemicals, energy, and water from waste.

Global Need for Strategic Resources

Access to important strategic resources, including minerals, metals, chemicals and other materials is critical for advancing renewable energy and the green economy. These include metals like copper (Cu), zinc (Zn), lead (Pb), rarer precious and valuable elements like gold (Au), silver (Ag), lithium (Li), vanadium (V), cobalt (Co), platinum group metals (PGMs), and rare earth elements (REEs).

Although conventional mining is still the primary source for these critical resources for the foreseeable future, conventional mining processes are generally environmentally destructive, emit significant amounts of greenhouse gases (GHGs) and consume large amounts of energy and water. Furthermore, locating new primary resources is a difficult and risky proposition, deposits are rare, and their development requires significant capital and lengthy approval processes. In addition, they are often found in areas of political uncertainty or instability.

Demand for chemicals and energy is still largely supplied by the petrochemical sector, and this is only increasing and adding to environmental challenges including increasingly also to problems around plastic waste. By 2060, over one billion tons of plastics are expected to be produced globally to eventually become part of our waste problem.

Biogenic waste from agriculture, forestry, livestock operations, food processing, as well as from municipal sources, represent additional growing waste management challenges.

Finally, water, a key and universally needed resource for many industries, is becoming increasingly scarce and valuable. Rising demand for water from expanding populations and industries are creating intense competition for this limited resource, straining natural aquifers and municipal water systems. In Alberta and elsewhere, this is becoming a limiting factor for industrial growth.

Currently, only about 68% of wastewater in North America is treated, and mostly for disposal. A mere 8.2% is treated for reuse, due to cost and complexity in its treatment.



Blue Eden offers solutions to our growing waste problems and to our problems around supply of critical resources by converting waste into value.

Blue Eden CleanTech Solutions, a six-year-old Alberta-based company, is deeply rooted in the resource development sector, including conventional petroleum, natural gas, and metal mining. The company recognizes the interconnected challenges around waste management, water scarcity, and resource extraction, and has made a commitment to addressing these issues, starting in Alberta and expanding into other Canadian and international jurisdictions.

Blue Eden, in a collaboration with Calgary-based Scovan Inc. and Germany-based research institute Fraunhofer Umsicht, are committed to implementing a joint solution to the growing problem around waste management, waste processing, and extraction of value from waste. The collaboration is an excellent combination of Blue Eden's vision of a waste-to-value future supporting circularity with Scovan's excellent and comprehensive

engineering capabilities, and their deep culture of innovation and implementation, and Fraunhofer's extensive global track record for developing innovative and new technology solutions in the green resource recovery space. Our collaboration is ready for the next steps, to jointly implement a flexible, scalable, and environmentally responsible solution platform to address waste, in liquid and solid form, from organic to inorganic sources, including complex mixed waste, to help alleviate critical supply shortages of important strategic resources by unlocking these from waste.

Our core Solution Platform

At the heart of Blue Eden's solutions is its electro-chemical treatment platform for wastewater. This versatile platform supports water conservation, by combining efficient wastewater treatment with water reuse and recycling, and finally facilitating responsible discharge. Its ClearBlue and PureBlue systems use minimal chemicals and rely primarily on electric power, which can come from renewable sources, to treat wastewater in modular, decentralized, centralized, and scalable systems. An added feature benefit of its solution, currently at pilot stage, is the ability to capture and repurpose hydrogen produced during wastewater treatment. Our electro-chemical solution is the enabling water treatment platform for the solid waste processing solution.

Within this portfolio of its flexible and adaptable platform, Blue Eden is also developing processes to extract valuable metals and materials from waste and process water, including wastewater associated with battery recycling, and from formation and produced water from subsurface oil and gas, mining, and geothermal operations.

Solid Waste Processing Platforms

Available through Blue Eden's European collaborating partner are two solid waste processing platforms, currently in the commercial development stage. These operate on thermo-chemical and thermo-catalytic principles.

The thermo-chemical process can handle large volumes of complex and mixed waste, including electronic waste, electrical equipment,

automotive shredder waste, windmill blades, and solar panels. It recovers critical metals, valuable chemicals, high-aromatic oils, gases, fibrous materials, energy, and water.

The thermo-catalytic process is applied to biogenic waste, converting organic waste to bio-oil, chemicals, gases (including green hydrogen and ammonia), high quality biochar with significant value for its carbon credit potential, and water.

Both processes offer unique and proprietary capabilities, and can process mixed heterogeneous waste, efficiently, with low energy consumption, low production of harmful chemical by-products, as modular and decentralized systems. The commercial development of these combined complex waste-to-value processing platforms are a key initiative of the Canadian-European collaboration.

Environmental and Industrial Impact

Blue Eden plans to build a first-of-its-kind comprehensive waste to value processing platform based on these technologies in North America, to help industry operate more efficiently, with lower emissions and energy consumption. These platforms will facilitate recycling and reuse of water, and will unlock strategic resources, such as metals, chemicals, and other materials from waste. The shift away from traditional "once-through" usage models for resources towards circularity offers a sustainable alternative for resource-intensive industries and for a resource hungry world.

Blue Eden is currently initiating the pre-feasibility phase of two comprehensive waste to value platform development initiatives, one in Alberta, and the other in Eastern Canada with Scovan. It is also evaluating other opportunities for similar developments elsewhere. Blue Eden and its collaborating partners are excited to be part of a solution implementation plan to address global waste, and the recovery of critical resources from waste. ■



LOSING FOCUS

BY JAESON CARDIFF, CEO, CLEANO2 CARBON CAPTURE TECHNOLOGIES INC.

Did you know up to 20 per cent carbon dioxide is produced when we heat buildings and heat water within those buildings?

When I started on a path of trying to solve the problem of carbon emissions from heating appliances, I had no idea how perilous this journey would become. The art of creating something new expands beyond ideation. In fact, creating a piece of hardware or software represents a small fraction of the work that's required. The real work is in overcoming countless problems and creating new solutions at every step.

In 2005, I began creating a new technology that could convert carbon emissions from the combustion of natural gas into a valuable by-product. Through development, Kathi Fischer, my friend and current Chief Science Officer and I discovered that the most straightforward application of our converted carbon by-product was in manufacturing soap products. Our technology, CarbinX, could capture the carbon dioxide produced and through a zero-waste process, upcycle the carbon through a reaction with potassium hydroxide into potassium carbonate, a key ingredient found in soap. The act of converting carbon into soap was a near-instant success and year after year, we won awards for the personal care products we were producing. This was largely due to the world-class formulator, Michelle Regel, who we brought in to help create our amazing products.

All the while, we were slowly losing our focus on the sole purpose of our technology and why be started on this journey in the first place. To reduce emissions.

Eventually, we got to the point where we stopped advertising the technology. Our marketing and business development people were so enamoured with our soap products that we lost sight of the key ingredient in our company, the CarbinX system. Our sleek carbon capture module became an afterthought. As a result of this, along with other factors too sensitive to relay here, our company found itself in deep financial trouble. Not only had we become known as the carbon capture soap company, but we found all of the work we had done to bring our technology to market fell behind schedule. By the time I recognized where we were at, cleantech investment was experiencing a downturn and one thing lead the next until I was faced with the difficult decision to lay off the majority of my staff. Letting people go as a result of something I did or as a result of a direction I took was gut-wrenching.

The lesson I've learned, and one I hope to pass on, is that losing focus doesn't have to be the end of the story. It's in those moments of misdirection that we gain clarity. We may have stumbled, but those stumbles taught us more than success ever could. Today, CleanO2 Carbon Capture Technologies stands stronger because we've learned the hard way that focus is everything. CleanO2 is now fully aligned with our original mission: reducing carbon emissions from heating appliances. That's the core of who we are, and that's where our focus will remain.

Our CarbinX system is the world's first micro-scale commercial carbon capture technology. The size of two refrigerators, CarbinX fits in a wide variety of spaces and supports a number of operation profiles such as manufacturing plants, commercial facilities, recreation centres, stadiums or high rise buildings. And, while we still make soap, it is our technology that is leading the way.

So, here's what I want to leave you with: Losing focus isn't failure. It's a detour, a reminder to recalibrate, and an opportunity to come back stronger, more determined, and more focused than ever. And that's exactly what we're doing. We're back, and this time, our sights are set on the mission that started it all. ■



SCOVAN STAR: RILEY SMITH



Never one to shy away from a challenge, Riley consistently goes the extra mile, readily assisting colleagues and supporting internal initiatives. His positive attitude, even in the face of hardship, is infectious and inspiring. Oliver Kohlhammer, VP Products & Projects, perfectly captures Riley's contributions:



Riley exemplifies the essence of the project managers Scovan was built upon—an engineer who not only masters the technical aspects of their discipline but also understands how each piece of a project connects together to accomplish the goal.



Riley is a natural problem-solver who skillfully breaks down complex issues into manageable pieces. He knows when to utilize his own expertise and when to seek support from his team, ensuring projects stay on track and deliver optimal results. Navigating between individual contribution and collaborative engagement is a hallmark of Riley's leadership style. He recognizes that true success lies in leveraging the diverse strengths of a team and creating an environment where each member feels empowered to contribute their perspective. His strong analytical mind and collaborative spirit were instrumental in his recent promotion to Project Manager in January 2024, a role in which he continues to excel.

Congratulations, Riley, on being recognized as a Scovan Rockstar! We are proud to have you on our team and are excited to see what you accomplish next. ■

We are proud to shine a light on Riley Smith, a dedicated and talented engineer who has quickly climbed the ranks within Scovan, showcasing the very best of our company's values.

Riley joined Scovan in September 2017 as an Electrical Engineer in Training after graduating with a Bachelor of Science in Electrical and Computer Engineering from the University of Calgary. His academic foundation, natural curiosity and strong work ethic quickly set him apart within the organization. He possesses a unique ability to see the bigger picture, understanding how all the parts of a project come together to achieve the end goal. Riley's holistic approach and strong client management and customer service skills paved the way for his well-deserved promotion to Electrical Engineer in June 2023.



THE HIPVAP ADVANTAGE

EMILY MUNRO, E.I.T., INNOVATION ENGINEER, SCOVAN

Seamless Integration for Sustainable Operations Now and in the Future

As Western Canada’s energy industry pivots towards more sustainable operations, integrating new technologies that can significantly reduce carbon emissions and water usage is essential for a successful transition. Now more than ever, solutions that can be seamlessly integrated with and complement existing facilities are needed to deliver environmental benefits sooner. At the forefront of this shift is Scovan’s own HipVap Indirect Fired Steam Generator (IFSG) technology. HipVap targets reduced CO₂ emissions, water usage, and land footprint by enabling the direct conversion of

produced water to steam, eliminating the need for much of the upstream water treatment processes traditionally required in SAGD. Due to its innovative design and proprietary scale prevention methods, HipVap’s ability to operate directly on produced water significantly reduces wasted energy by maintaining the water at temperature. Moreover, eliminating the need for extensive produced water treatment and cooling allows the removal of much of the upstream process equipment and complexity compared to existing technologies.

To advance the technology readiness level from 6 to 8, a commercial pilot demonstration project is underway and will reach a successful close at the end of 2024. Having commenced operations in 2022, the HipVap pilot has enabled extensive testing and qualification of the technology. The pilot was hosted and integrated into the Strathcona Resources Lindbergh SAGD facility, allowing testing within a live operating system. This testing proved HipVap’s ability to generate steam from produced water. It helped refine and characterize the technology on a wide range of process conditions, ensuring a solid basis for commercial and economic estimates and guiding refinements to the design and configuration of auxiliary equipment.

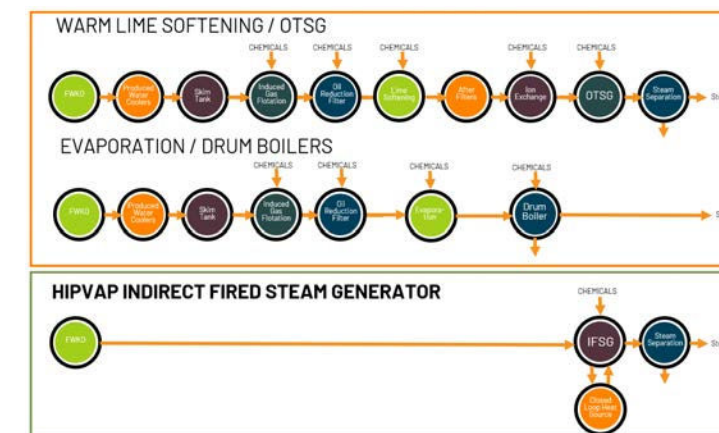
Throughout its design, fabrication, construction, and two years of operations, the project garnered support from organizations, including Alberta Innovates, having been selected into the inaugural cohort of the TIER Economic Recovery Program and was awarded

through the Clean Resources Innovation Network (CRIN) Reducing Environmental Footprint Technology Competition. During its operation, the pilot further supported developing and testing other novel technologies, including the ORSIL wastewater treatment system and an artificial intelligence-powered data visualization and optimization platform for enhanced HipVap operations, which was co-developed with Drishya AI Labs.

Having already completed the early design of a commercial-scale 1000 TPD HipVap IFSG system, the success of the pilot project brings the final stage of commercialization for the technology within reach. With the increasing push for decarbonization of Canada’s energy industry, HipVap represents a momentous achievement for the present and future of sustainable steam in SAGD.


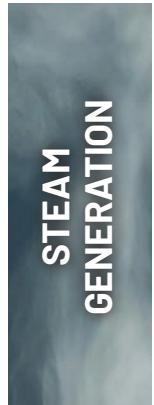
As Canada’s energy industry continues to evolve, agile and flexible design will be crucial for continued progress in emissions, water use, and waste reduction. HipVap is poised at the leading edge of SAGD innovation with a modular, easily deployable design that can add steam capacity with minimal disruption to existing systems. Ease of adoption will help ensure rapid deployment of the revolutionary IFSG technology, allowing organizations to create meaningful emissions reductions sooner. Furthermore, efforts to develop an integrated AI-optimization platform throughout the HipVap pilot will provide clients with the option to enhance the environmental and economic benefits of the IFSG system by incorporating AI-powered optimization into everyday operations.

With its potential as a standalone solution, its ability to integrate with existing facilities, and a future as a fully pad-based deployment, HipVap provides choice and flexibility in the transition to sustainable SAGD operations. Scovan’s commitment to the ongoing development and advancement of HipVap will ensure that it remains a leader in innovative energy technologies, setting a benchmark for the industry’s transition towards a more sustainable future.



Replace These:

With This:

EVAPORATORS + DRUM BOILERS	OR	WLS + OTSG	HIPVAP IFSG SYSTEM
 <ul style="list-style-type: none"> • PW Glycol Exchanger Skid • ORF Feed Tank • Produced Water Surge Tank • Surge Tank/Desand Skim/Floor Drain Pump Skid • Produced Water Separator System • ORF Feed/Skim/Wash Water Pump Skid • OIL Removal Filter #1 • Oil Removal Filter #2 • De-Oiled Water Tank Disposal/ORF Backwash Pump Skid • Inj./PW Inj. Pump Skid • De-Oiled Water/Skim Pump Skid • Desand Tanks 		<ul style="list-style-type: none"> • PW Cooler • ORF Feed Tank • Produced Water Surge Tank • Surge Tank/Desand Skim/Floor Drain Pump Skid • Produced Water Separator System • ORF Feed/Skim/Wash Water Pump Skid • Oil Removal Filter #1 • Oil Removal Filter #2 • De-Oiled Water Tank • Disposal/ORF Backwash Pump Skid • Inj./PW Inj. Pump Skid • De-Oiled Water/Skim Pump Skid • Descand Tanks 	<ul style="list-style-type: none"> • Feed Tank
 <ul style="list-style-type: none"> • Raw Water Tank • Raw Water Ion Exchanger Skid • Soft Water Tank • Soft/Utility Water Pump/Make-up Water Heater Skid • Source Water SAC Backwash/Raw Water Pump/Heater/Filter Skid • Evaporator Package • Utility BFW Pump/Utility Boiler Skid • Chemical Injection Pump Skids • Chemical Tanks 		<ul style="list-style-type: none"> • Lime Feed Package • MagOx Feed Package • WLS • WLS Overflow Tank • WLS Overflow Tank Pump • After Filters Package • WAC Primary Package • WAC Polish Package • Dirty Backwash Tank • Dirty Backwash Pump • Backwash Pump 	<ul style="list-style-type: none"> • Chemical Injection Pump Skids • Chemical Tanks
 <ul style="list-style-type: none"> • Raw Water Tank • Raw Water Ion Exchanger Skid • Soft Water Tank • Soft/Utility Water Pump/Make-up Water Heater Skid • Source Water SAC Backwash/Raw Water Pump/Heater/Filter Skid • Evaporator Package • Utility BFW Pump/Utility Boiler Skid • Chemical Injection Pump Skids • Chemical Tanks 		<ul style="list-style-type: none"> • BFW/BD Exchanger • BFW Tank • BFW Tank Pump • OTSGs • LP Steam Separator 	<ul style="list-style-type: none"> • Hot Oil Heater + Heat Medium Fill • Hot Oil Expansion Drum • LP + HP HO Recirculation Drum • IFSG Pre-Heater • IFSG Heater • Stream Separator • Flash Vapour Condenser • Recovered Condensate Drum • HP Feed Pump • IFSG Recirculation Pump • RC Pump

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FROM SETBACKS TO SUCCESS: MY PROUDEST MOMENT IN SPORT

KRISTEN BUJNOWSKI, CANADIAN OLYMPIAN | BOBSLEIGH ATHLETE
| MECHANICAL ENGINEER | MASTER'S STUDENT IN COUNSELING
PSYCHOLOGY



As a brakeman, I've had the privilege of representing Canada on the world stage. I've achieved Canadian records, won multiple World Championship medals, and stood on the podium after World Cups. In 2022, I was the top Canadian brakeman and helped our team finish 5th at the Beijing Olympics. My journey as a brakeman was not always easy, and my transition to a pilot has been anything but smooth.

My first time as a pilot in Park City, Utah, a track known as "easy," was grueling. I struggled so much that the coaches eventually took me out of the race. It was one of those moments where I questioned everything - my abilities, my future in the sport, and my resilience. Months later, I lost the financial support of the team. But I wasn't willing to give up.

I rented a truck and drove alone with a sled from Whistler to Park City. When I arrived, I realized there would be no coach to help guide me through. It was just me, my 165 kg sled, and the track.

The first five weeks were unremitting. I hit walls, smoked out of corners, and even crashed three times in a row. The physical and mental toll was exhausting. After seeing me struggle for days, track workers began offering help. They watched corners with me, discussed lines, and encouraged me.

By the time I left, I had a better understanding of the track, but I was far from good. Still, I knew I was improving, and that kept me going.

The following season, I found myself back in Park City. My driving had improved, but I was still performing poorly in races. When my team showed up for race week, I felt a mix of nerves and pressure. Everyone assumed I would do well because I had trained there last year. But in the back of my mind, I couldn't shake the doubts. I hadn't been good last year. Why would things be any different now?

I paid for extra training runs before race week. My first run down the track that day was a revelation. I didn't touch a single wall. When I reached the bottom, I was overwhelmed with joy and relief. I finally felt like I had finally broken through.

Just as I was riding that high, we received a message. Due to equipment issues, there wouldn't be enough sleds for the Canadian pilots, and based on my performance up to that point, I wouldn't be racing. I was devastated.

I spent some time feeling sorry for myself, but I knew there had to be a solution. I found out there was a monobob in Park City that wasn't being used. I reached out, completed my first wire transfer, and rented the sled for the week.

To my surprise, not only did I set a start record, but I won the race. One of the track workers who had helped last winter presented the medals. In front of the entire crowd, he shared how proud he was to see me come back and win after witnessing my struggles the year before.

That moment is one I carry with immense pride. It wasn't about the medal or the record but the journey. It was about proving to myself that I could get back up after every fall and keep going, even when no one was watching.

That victory symbolizes resilience, determination, and the quiet strength that grows in the hardest moments. And it's a reminder that success often comes when we're willing to keep pushing through our lowest points. ■



LEADING THE WAY TO SUSTAINABILITY:

NIKOLAS PATENTALAKIS, AREA SALES MANAGER, DMT CLEAR GAS SOLUTIONS

DMT CLEAR GAS SOLUTIONS IN RENEWABLE ENERGY TURNING ORGANIC WASTE INTO ENERGY

Biogas, produced from the decomposition of organic materials such as manure, agricultural waste, wastewater, and food waste, contains a mix of methane (CH₄) and carbon dioxide (CO₂). These gases are major contributors to climate change if released into the atmosphere. DMT CGS upgrades this biogas into biomethane, or Renewable Natural Gas (RNG), with many applications. It can be injected into the existing gas grid to provide heating and electricity or compressed into Bio-CNG to fuel vehicles. RNG can also be used in industrial applications, replacing conventional natural gas in processes that require high heat. This flexibility makes RNG a key component in the transition to a more sustainable energy future.

The Carborex[®] MS system, DMT's flagship technology, is designed to upgrade raw biogas into biomethane. DMT's solution allows clients to generate sustainable energy and reduce reliance on fossil fuels. Additionally, DMT's CO₂ liquefaction technology enables clients to recover CO₂, producing food-grade quality CO₂ while reducing waste and creating new revenue streams. This reduces greenhouse gas emissions and transforms waste into a valuable energy resource.

Understanding the Upstream Side: Biogas Feedstocks and Use Cases

RNG's potential depends heavily on the availability and quality of its feedstocks. Biogas can be produced from a variety of organic materials, including manure, food waste, wastewater sludge, and agricultural residues. Each feedstock presents different challenges and opportunities. For instance, dairy farms are a significant source of biogas, as manure naturally emits methane as it decomposes. Capturing this methane before it escapes into the atmosphere reduces emissions and provides farmers with an additional revenue stream by selling RNG or using it to power their operations.

Municipal solid waste and wastewater treatment plants also contribute significantly to biogas production. These facilities offer a reliable and continuous source of biogas, but there are challenges in scaling these operations and ensuring that all available waste is captured efficiently. Furthermore, biogas production from food waste and industrial organic waste is gaining traction but requires consistent sourcing and management of feedstock. Specifically in rural areas, transportation and logistics can pose difficulties, as the costs and complexities of establishing these collection networks can deter broader adoption.

Challenges of Integrating RNG into Existing Energy Infrastructure

The infrastructure for RNG as a transportation fuel is still developing. Bio-CNG, produced from upgraded biogas, offers an alternative to diesel and gasoline, particularly for heavy-duty vehicles. However, building sufficient refuelling infrastructure for widespread adoption remains a barrier. Transporting RNG from production sites to refuelling stations presents logistical complexities and costs. Further investments in infrastructure and policy support are needed to fully integrate RNG into mainstream energy and transportation systems.

Balancing Opportunity with Challenges

While the RNG industry holds immense promise, it faces hurdles that cannot be ignored. Policy frameworks supporting RNG adoption vary across regions, which can create uncertainty for investors and developers. Financial incentives, carbon credits, and clear regulations are essential to encourage the expansion of RNG production and infrastructure. Moreover, public awareness and acceptance of RNG as a clean energy source are critical for its widespread implementation.

DMT CGS is addressing these challenges through its innovative technologies, but collaboration with policymakers, industry leaders, and local communities is essential to fully unlock the potential of RNG. By transforming organic waste into clean energy, DMT CGS is not only contributing to a more sustainable future but also helping to drive the transition to a low-carbon economy.

As DMT CGS continues to develop cutting-edge solutions in biogas upgrading and CO₂ recovery, the company remains committed to overcoming the obstacles that face the RNG industry. DMT is playing a crucial role in the renewable energy revolution by focusing on technical innovation and the broader integration of RNG into global energy systems.

To find out more about DMT CGS, please visit <https://www.dmt-et.com/> or contact info@dmt-cgs.com ■



SCOVAN'S FABRICATION CAPABILITIES:

TREVOR PHENIX, P.ENG., VP DEVELOPMENT, SCOVAN



DRIVING VALUE THROUGH INNOVATION

Our journey began with the need to address specific challenges, but it has since evolved into a company-wide approach that brings value to our clients at every level. Scovan's PadX product and our collaboration with the PadX Consortium catalyzed change. The transformation of our fabrication facility and our innovative approach has had a profound impact on the entire organization.

Scovan's vision was to enhance value and efficiency for small to mid-sized producers in the industry through a streamlined, repeatable, and optimized product. This product would enable our fabrication facility to operate in line with lean manufacturing principles and the Toyota Way. Throughout this journey, we have achieved numerous milestones and made significant strides.

The change began with a shift in mindset, transitioning from a traditional fabrication facility to one that integrates real execution feedback into our planning and processes. This feedback loop was crucial in ensuring seamless collaboration among our teams as we embarked on the iterative process of developing our industry-changing product, alongside the PadX Consortium, consisting of four partnering producer clients.

We then focused on optimizing the flow of people, equipment, and projects through our 53-acre facility. Scovan implemented a rolling setup to support continual batch processing of large projects on an as-order basis. This innovative system enables us to maintain a steady workflow, ensuring efficient and effective fulfillment of our clients' needs. Following a lean manufacturing approach, we restructured how we move crews within our yard and shop, creating continuous workflows with modules staged for fabrication and different modules in other zones. This method has boosted efficiency and improved the quality of our output.

Our purchasing process underwent refinement to strike a balance between just-in-time inventory and mass purchasing, aligning with the needs of our long-lead inventory program. This strategic approach allows us to tailor solutions for each project or product, reflecting our commitment to innovation.

Leveraging the manufacturing experience and feedback loop developed through PadX, Scovan has become more efficient in handling custom projects for clients. We now operate as a manufacturing facility, embracing a lean manufacturing approach instead of a traditional fabrication shop. This shift has allowed us to optimize and enhance efficiencies.

Our collaboration with the PadX Consortium has facilitated our growth, adaptability, and continuous improvement. The consortium's support has been instrumental in creating processes that benefit all our clients, ensuring the delivery of the best results.

At Scovan, we focus on our core strengths while partnering with others to offer complementary services. Through these partnerships, we add value, expedite schedules, and optimize outcomes for our clients.

Our emphasis on lean manufacturing underscores the importance of organization, cleanliness, and systematic project approaches.

Working with the PadX Consortium has been pivotal in our growth and continuous improvement. This partnership has enabled us to develop processes that benefit all our clients, providing more value, expediting schedules, and optimizing results.

Scovan Fabrication is not just about manufacturing products; we excel in producing custom projects for our clients. Our facility houses a large, experienced team transitioning between manufacturing and custom work, ensuring our workforce is always prepared to meet client needs. Our shop operates continuously with a consistent and reliable workforce, eliminating the need to scramble for staffing. We maintain peak efficiency and flexibility with hundreds of well pairs in our pipeline.

Our agile manufacturing system strikes a balance between structure and efficiency while remaining adaptable to client needs. We offer flexibility in addressing documentation, inspection, quality control, field installation, and design requirements.

In conclusion, Scovan's fabrication capabilities are a testament to our commitment to innovation and efficiency. By integrating feedback, leveraging partnerships, and maintaining a flexible approach, we continue to drive value for our clients at every level. ■

AGILE AND EFFICIENT Fabricating Large-scale Modules on 53 Acres

Scovan's lean manufacturing approach to fabrication brings structure and efficiency while allowing for flexibility to meet unique client needs. Our long-term fabrication team is ready for your next custom fabrication project.



Connect for clarifications or an estimate.

Scovan

www.scovan.ca/fabrication





ESG LEGAL RISK AND DISCLOSURE:

CONOR CHELL, PARTNER, NATIONAL LEADER ESG LEGAL RISK & DISCLOSURE

A YEAR IN REVIEW

The landscape of environmental, social, and governance (ESG) regulations in Canada has undergone a significant transformation over the past year. What was once primarily viewed as a compliance checkbox has evolved into a legal imperative, with significant litigation risks and penalties for false, misleading, or unsubstantiated claims. As stakeholders demand greater transparency and accountability, Canadian companies are entering a new era where ESG reporting is a critical business obligation, not just a best practice.

ESG disclosures are not new to Canadian companies. For years, public companies have been required to report annually on board and senior management diversity, executive compensation, and material environmental risks. As businesses responded to growing stakeholder demand for transparency, voluntary ESG disclosures – through sustainability reports, ESG surveys/questionnaires, or investor presentations – have become increasingly common.

However, mandatory reporting requirements and regulations requiring public disclosure of ESG information are increasing. Several new mandatory reporting requirements were introduced this year:

- **Forced and Child Labour:** companies must now report annually on steps being taken to prevent forced and child labour within their supply chains;
- **Plastic Use:** companies are required to annually report on the quantity and types of plastics and associated materials companies manufacture, import, place, and manage in Canada, with 2024 information forming the first report due on September 29, 2025; and
- **Forever Chemicals:** companies must report on their manufacture, import, and use of per- and polyfluoroalkyl substances (“PFAS”), with a compliance deadline of January 29, 2025.

Moreover, the Canadian Securities Administrators (CSA) have signaled rules for mandatory climate-related disclosures for issuers are forthcoming and will consider the final Canadian Sustainability Standard Disclosure standards.

The growing volume of ESG information that companies must report today, and in the near future, is met with heightened expectations on both the quality and accuracy of this information. Regulators are now focusing their investigation and enforcement efforts on greenwashing. In March 2022, the CSA published guidance concerning ESG or sustainability-related disclosures to guide issuers in improving their continuous disclosures. The guidance states that issuers should avoid misleading, unsubstantiated, or otherwise incomplete claims about ESG and sustainability-related aspects of their business that convey false impressions. Two years later, in March 2024, the CSA published similar guidance discouraging greenwashing and unsubstantiated

claims of ESG-related investment funds, stating that all such ESG claims and disclosures in offering documents, continuous disclosure materials, and sales communications should be factual, balanced, and substantiated.

Three months later, Parliament amended the Competition Act via Bill C-59 introducing new anti-greenwashing provisions, placing the burden of proof onto companies to prove their environmental and social claims made to the public are substantiated. Those that cannot back up their claims will face stiff penalties.

Companies are divided on the impact of these new greenwashing provisions. Some believe companies will now hesitate to voluntarily disclose environmental information, including efforts to reduce their environmental impact, while others argue these provisions are modest amendments which do not go far enough. Importantly, the Commissioner of Competition, Matthew Boswell, referred to these recent amendments as part of a “new era of competition enforcement” best thought of as a “generational change” to Canadian competition law.

While we expect the Bureau will soon publish guidelines, informing companies on how it intends to enforce the new greenwashing provisions, companies should proactively take steps today to start aligning with the new provisions such as assessing their public disclosures from a legal risk perspective and enhancing their internal controls and compliance systems. A proactive and constructive approach can help avoid litigation, regulatory, and reputational harm. As more legislative changes, such as Bill C-372 (Fossil Fuels Advertising Act) and Bill S243 (Climate Aligned Finance Act) advance through Parliament, companies should only expect more regulatory oversight to follow.

It is no longer optional for companies to not take accountability for, or provide further transparency into, their public ESG commitments. Companies that fail to adapt will not only risk legal repercussions but also lose the trust of the public and the investment community. ■



LEFT TO RIGHT: TAYLOR BEHN-TSAKOZA, COMMUNITY LIAISON & RESEARCH COORDINATOR, TU DEH-KAH GEOTHERMAL | ANDREA WARREN, PROJECT COORDINATOR & MEDIA & COMMUNICATIONS SPECIALIST, TU DEH-KAH GEOTHERMAL | CYNDI BONN, TRAINING & EMPLOYMENT COORDINATOR, TU DEH-KAH GEOTHERMAL | JIM HODGSON, CHIEF EXECUTIVE OFFICER, TU DEH-KAH GEOTHERMAL

Q & A WITH DEH TAI LP AND TU DEH-KAH GEOTHERMAL

BY BLAIR NIELSEN, ACCOUNT MANAGER, SCOVAN, WITH ANDREA WARREN, PROJECT COORDINATOR & MEDIA & COMMUNICATIONS SPECIALIST, DEH TAI LP., AND THE TU DEH-KAH GEOTHERMAL TEAM



Blair Nielsen: To begin, could you tell us a bit about your roles within Deh Tai and the Fort Nelson First Nation, and what inspired you and the Nation to pursue this ambitious geothermal project and the wider portfolio of ventures under Deh Tai?

Andrea Warren: Within Deh Tai and Fort Nelson First Nation, I serve as the Project Manager and Media & Communications Specialist for Tu Deh-Kah Geothermal. My role involves project coordination, budgeting, and managing communications to align our initiatives with our vision of sustainable energy sovereignty. Taylor Behn-Tsakoza, our Community Liaison & Research Specialist, ensures ongoing engagement and research that reflect the community's values

and needs. Cyndi Bonn, our Training and Employment Coordinator, oversees skill development initiatives, ensuring community members are prepared to take on roles within this and future projects.

Our inspiration to pursue this geothermal project and the wider Deh Tai portfolio stems from a shared vision within the Nation to create a resilient, self-sustaining future for our people. Harnessing geothermal energy will allow us to address energy security and independence while promoting Indigenous-led innovation in clean energy. This project and Deh Tai's broader ventures represent our commitment to economic resilience and environmental stewardship, blending modern technology with traditional values.

For our community, these initiatives mean more than just economic opportunity—they embody a future of self-reliance, cultural pride, and resilience. For Indigenous-led innovation in the energy sector, our work signals a new chapter, showcasing the expertise and leadership our communities bring to the global transition toward sustainable energy.

BN: Deh Tai's commercial model seems uniquely tailored to balance economic development with sustainability and cultural values. Can you share more about this model and how it supports Fort Nelson First Nation's vision for self-reliance and community empowerment?

AW: Deh Tai Limited Partnership was formed in 2018 by Fort Nelson First Nation. Under the direction of the Deh Tai board of directors, Deh Tai's role is management the Nation's for-profit business ventures, employment and training matters related to economic development projects and business development ventures. The business structure separates business activities, such as Tu Deh-Kah Geothermal, from the Nation eliminating any liability exposure. Our mission is to develop and grow profitable, sustainable business ventures while providing career opportunities for members of the Nation. As Deh Tai becomes more established and its group of ventures expands it will provide economic independence.

BN: Deh Tai's portfolio is impressive, ranging from renewable energy to civil construction, hospitality, and land development. How does the diversity of ventures like Peak Renewables, Eh Cho Dene, and your hospitality businesses contribute to long-term resilience and growth?



AW: Deh Tai has a number of companies such as Eh Cho Dene, a very successful civil construction company with a 40+ year operating history, an on reserve gravel operation, Dene Gravel and the Liard Hot Springs Lodge at Mile 497 of the Alaska Highway, providing lodging, RV spots, restaurant and fuel for Alaska Highway travellers. In Fort Nelson the Fort Nelson Hotel and associated commercial and residential operations was acquired in 2018, and more recently the development of a geothermal power project is under way in the Clarke Lake depleted natural gas field adjacent to the Nation.

Sustainable logging operations are being assessed along with related projects such as wood pellets or off-cut material in biomass opportunities. The Nation holds a large block of land on Vancouver Island slated for commercial development in the coming years.

BN: With nearly \$40.5 million in federal funding, including support from NRCan's Emerging Renewable Power Program, what have been some of the key milestones so far in developing the Clarke Lake Geothermal Project? Are there specific challenges that the project has encountered, and how have they been addressed?

AW: The Clarke Lake gas field was known to be a 'hot' field with flowlines bare in the frigid winter temperatures as the snow would melt off and around them. Initial research indicated a strong possibility of geothermal potential under the gas field in the brine aquifer 2 ½ km under the ground. Key milestones have been acquisition of a depleted natural gas well in late 2020 that was deepened from 1800 metres to 2450 metres, converted to a water injection well and the drilling of a full size geothermal well on the same well pad. Over 2021 and 2022 the production well was tested to prove up the reserve through a high volume pump test, an extended pump test 30+ days and well logging and measurement. This work proved the resource with downhole temperatures around 125°C and ability to deliver 114°C brine to surface.

Initial issues were getting field work carried out during COVID and our remote location in Fort Nelson. Logistics of getting people and equipment to the area and testing completed. Based on the 160+ wells drilled in Clarke Lake from the 1960's we anticipated a certain low level of natural gas in brine. What we experienced was much higher and has led to rethinking our engineering to handle both hot brine and natural gas. Our initial field layout completed and costed was economic but, wanting to improve the economics, we have moved to a smaller surface footprint which will save capital costs and minimize surface disturbance.

This work is being finalized now as we move to permitting the well sites, resource gathering system (pipelines) and power plant working with Fort Nelson First Nations Lands Department.

BN: Beyond providing clean energy, what are some ways the project will benefit the Fort Nelson community? How will economic development, employment, and training opportunities be integrated to empower the local workforce?

AW: The Tu Deh-Kah Geothermal project will benefit the Fort Nelson community in several ways. It will attract investment, diversify the local economy, and create business opportunities. The project will also generate jobs in construction, engineering, and ongoing operations for local workers. Workforce development programs will provide training in geothermal energy, offering hands-on experience and mentorship to build local capacity. By prioritizing local hiring and contractors, the project ensures that the community directly benefits. Additionally, the use of geothermal energy will reduce energy costs and provide long-term, reliable power, contributing to a resilient economy. The project will also empower the community by engaging youth and Elders, integrating traditional knowledge with modern technology.

BN: Deh Tai has formed joint ventures with organizations like Peak Renewables and other specialized partners. How have these partnerships helped Deh Tai expand its capabilities, and what do you look for in potential partners for new initiatives?

AW: Deh Tai partners with organizations that bring knowledge and skills to the Nation that can be transferred to our members. We seek to be full partners with an equity stake in the business ventures and the opportunity to acquire more over time, and potentially 100% of the business. All business arrangements include maximizing the use

of Fort Nelson First Nation (FNFN) businesses and member owned businesses in our projects as they are being developed. For example, logging has not taken place in Fort Nelson for an extended period of time. We have worked with two forestry companies to cut two fire breaks around Fort Nelson and more recently have carried out wildfire salvage operations on a pilot basis.

BN: The Clarke Lake Geothermal Project is within Treaty 8 territory. How does the project align with the Nation's values regarding environmental stewardship and cultural preservation? Are there specific measures taken to honour these values?

AW: The Tu Deh-Kah Geothermal project aligns with Treaty 8 values by focusing on both environmental stewardship and cultural preservation. The project repurposes the Clarke Lake gas field for geothermal energy, reducing reliance on fossil fuels and supporting sustainable resource management. It also honours the Nation's heritage through the name "Tu Deh-Kah" ("Water Steam"), reflecting the community's deep connection to the land. The project actively engages youth and Elders, ensuring the integration of traditional knowledge. As a 100% Indigenous owned and operated initiative, Tu Deh-Kah is fully committed to respecting and upholding the Nation's values.

BN: The focus on renewable energy, forestry, and responsible land development suggests a strong commitment to sustainability. How does Deh Tai integrate sustainability principles across different ventures, especially in areas like logging and land holdings?

AW: Deh Tai LP works closely with the FNFN Lands Department, following their comprehensive Land Management Framework, which sets high standards for land stewardship. As the proponent of the Tu Deh-Kah Geothermal project, we adhere to these same guidelines, ensuring that our operations align with both environmental and community values. We take a holistic approach to resource use, similar to the saying, "use the whole moose," meaning that we harvest every part of the resource. In the case of the geothermal project, we are not only extracting heat from the geothermal wells but also utilizing natural gas when possible. This natural gas is used to offset parasitic power load generated by electric submersible pumps or to provide additional heat to optimize the geothermal power plant. The first phase of heat harvesting focuses on the heat exchangers in the power plant, while future phases will include a cascade of

heat opportunities, such as heating buildings, greenhouses, and potentially a spa or onsen-style pools. There is also potential for critical mineral extraction from the brine, if concentrations are sufficient. Finally, after the heat is extracted, the cooled brine is returned to the aquifer to be reheated, completing the cycle and ensuring sustainable use of the resource.

BN: Once operational, the geothermal plant is expected to produce 7 to 10 megawatts of electricity. Are there plans to expand the project further or explore additional renewable energy projects within the region?

AW: Once the initial plant has been commissioned we will seek opportunities to expand the power generation capacity by drilling more wells and installing more power generation capacity. Initially we plan to supply power for the NRRM which will replace natural gas generated power thereby reducing CO2 emissions. The additional power can be used to expand the industrial base by providing power to sawmills, data centres, hydrogen generation, biofuels opportunities. As LNG exports grow on the west coast of British Columbia the production of natural gas will move north from the Montney to the Horne River and Liard Basins and those facilities will require power.

BN: With Deh Tai's mandate to oversee Fort Nelson First Nation's for-profit ventures and economic initiatives, how does this geothermal project align with the broader vision of economic self-sufficiency and innovation?

AW: The Tu Deh-Kah Geothermal project aligns closely with Deh Tai LP's broader vision of economic self-sufficiency and innovation by creating sustainable, long-term economic opportunities for the Fort Nelson First Nation. It directly supports the goal of making the region and the Nation power self-sufficient, reducing reliance on external energy sources. The project not only provides clean and reliable energy but also contributes to food security through planned greenhouses, which will support both the Nation and the surrounding region, while also offering potential for commercial expansion. Additionally, the geothermal project will create approximately 25 full-time positions in the power plant, along with jobs associated with other initiatives, including the greenhouses and other ventures under review. This approach fosters innovation by exploring value-added opportunities, such as using geothermal heat for greenhouses,



spas, and potentially critical mineral extraction. By developing and controlling such resources, the project ensures the First Nation's long-term financial sustainability and strengthens its position as a leader in renewable energy and economic growth.

BN: Deh Tai's success has set an example for Indigenous-led economic development. What advice would you offer other First Nations or Indigenous groups looking to pursue similar ventures, and what do you hope to achieve as a leader in this space?

AW: Deh Tai's success in leading the Tu Deh-Kah Geothermal project sets a strong example for Indigenous-led economic development, showcasing how combining traditional knowledge with innovative, sustainable technologies can create lasting benefits. For other First Nations or Indigenous groups looking to pursue similar ventures, our

advice would be to prioritize collaboration within the community and with external partners who share your values. Deh Tai's structure encourages forming partnerships with organizations seeking to enter the territory and carry out business activities. These partnerships must align with the Nation's community goals for development, ensuring that all activities are sustainable and respectful of the community's traditions and values.

Additionally, it's vital to invest in capacity-building and education for community members, particularly youth, to ensure they have the skills and knowledge needed to lead such projects in the future. Empowering the next generation is key to maintaining the sustainability of the venture and strengthening community resilience.

As leaders in this space, we hope to continue demonstrating that Indigenous-led projects can not only succeed but also lead the way in innovation, sustainability, and economic independence. Through projects like Tu Deh-Kah, we aim to set a precedent for other Indigenous communities, showing that we can take control of our economic futures while honouring our cultural heritage. Our goal is to inspire more First Nations to embrace clean energy solutions and sustainable development, paving the way for a brighter and more self-sufficient future.

BN: What strategies are in place to engage and train the local workforce across Deh Tai's initiatives, particularly in sectors like civil construction, renewable energy, and hospitality? How is this helping Fort Nelson First Nation build long-term expertise and economic independence?

AW: Tu Deh-Kah hopes to offer local expertise and a skilled workforce within Fort Nelson First Nation through various initiatives. In civil construction, we plan on providing hands-on training and apprenticeship programs, allowing local workers to gain experience on projects like the Tu Deh-Kah Geothermal power plant. In renewable energy, we hope to offer specialized training in geothermal technology and operations to build technical expertise. We are not only repurposing abandoned gas wells but also

repurposing oil and gas assets, such as workers. Many community members have taken power engineering training, which supports the transition to renewable energy. In hospitality, we plan on developing skills in customer service and management for potential initiatives like spas and greenhouses. These training opportunities aim to empower community members, reduce reliance on external labor, and promote long-term economic independence and sustainability.

BN: The Fort Hotel and Laird Hotsprings Lodge are not only business ventures but also community hubs. How do these entities support the Nation's economic goals and provide cultural and social value to the community and visitors alike?

AW: They are being transitioned to provide cultural and social value to the community from being purely business ventures. We are working to make them showcases of the Nation.

BN: Thank you for your time and insights. ■





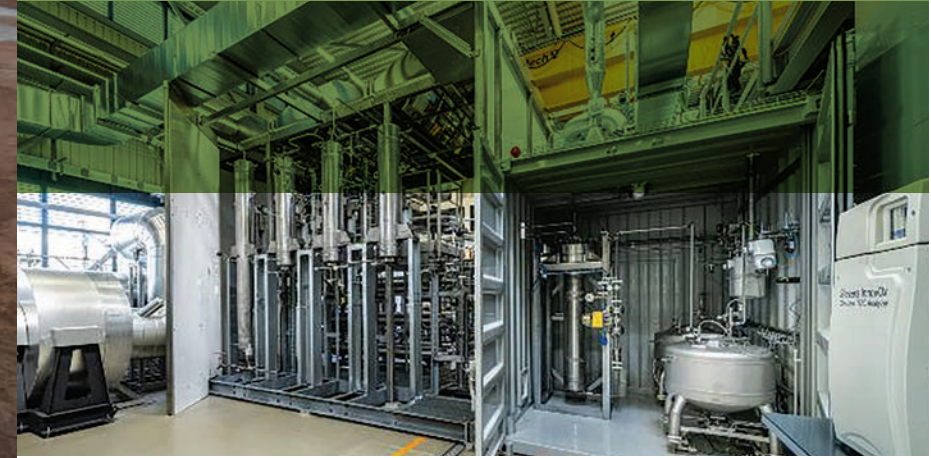
RETHINKING WASTE

JACOB STERN, VICE PRESIDENT, RNG PRODUCT DELIVERY, MONTROSE

How will the energy transition shape the future of carbon circularity technologies?

While there is broad consensus on what constitutes renewable energy, evaluating and comparing these sources and proving their overall value in improving environmental conditions presents a complex challenge for governments and businesses alike. A more practical and actionable approach to addressing climate change initiatives will emerge by developing a composite framework for energy transition and carbon circularity.

Achieving an effective transition to large-scale use of these technologies will require a shift in perspectives, focusing on



overcoming current roadblocks. For example, as novel hydrogen production methods promise lower costs, they will simultaneously introduce new challenges related to storage, transmission, utilization, and safety, further complicated by local, federal, and global policy landscapes. Given the long lifecycle of technology development, it's essential to anticipate second and third-order challenges before wider anticipation.

Utilization of waste to produce renewable energy – is this waste treatment or energy creation?

The answer is both! Our most immediate challenge with waste is its sheer volume and variety. It is generated wherever industries, businesses, and people exist, making waste a globally distributed problem. Whether it's treated wastewater or solid waste that is sorted, landfilled or recycled, the scale of this issue is staggering. Every year, 2 billion tons of municipal solid waste are generated, and 34 billion gallons of wastewater are treated daily in the U.S. alone. These figures are expected to rise by 70% by 2050 due to population growth.

By inventing, implementing, and continuously improving technologies that convert waste into energy, nutrients, or clean water, the environmental impact of waste can be mitigated. The result is cleaner air, water, and energy sources that offset fossil fuel consumption. Additionally, there is flexibility in what type of energy can be produced from waste, be it hydrogen, renewable natural gas,

LNG, liquid fuels, or electricity. However, each waste-to-energy technology comes with its own techno-economic benefits and limitations. Carbon capture, utilization and sequestration can also enhance these technologies, aligning them with circularity goals.

How do we expand the application of waste-to-energy solutions?

At its core, the energy transition mirrors challenges faced during past technological revolutions. When considering the adoption of waste-to-energy technologies, it's essential to consider key factors, document assumptions, and plan accordingly:

- **Waste Source:** Ensure contractual security and assess price, consistency, and quality.
- **Technology:** Evaluate the viability and scalability of the technology in relation to waste type, its mechanical and process limitations, and current technology readiness.
- **Execution:** Consider project processes, contract structures, risks, timelines, permitting, and operational requirements.
- **Products:** Assess the market value of the energy produced (e.g., through offtake agreements), cost offsets, and the potential for credit security (if applicable).

Europe has led the way in policy-driven initiatives around renewable natural gas from anaerobic digestion over the past 30 years, and now North America and other developed countries are increasingly adopting similar solutions.

We are on a quest!

Montrose Environmental Group is developing solutions that will help communities convert waste into valuable resources. We don't want waste to be wasted. Our hope is to further energy access and community development in a more environmentally sustainable way.

Our biogas team is focused on anaerobic digestion systems that process various waste streams, including wastewater, manure, agricultural residues, and industrial food production waste, to produce renewable natural gas. Additionally, the team is exploring hydrothermal processing to generate hydrogen, LNG, and liquid fuels. ■



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