

IGNITE

Scovan Engineering | December 2020 Volume 1

Scovan 
FORWARD ENGINEERING

Boosting Clean Energy with AI

By Amardeep Sibia, Founder & CEO of Drishya AI Labs (Calgary/Bangalore)

Breaking from the Energy Herd

By Graeme Edge, Co-Founder of the Energy Disruptors: UNITE event series

Lithium – Alberta's Future is Electric

By Chris Doornbos, President & CEO of E3 Metals

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Calgary in the New Economy

By Mary Moran
President & Chief Executive Officer, Calgary Economic Development

“The companies that embrace digital transformation will be the disruptors in this rapidly-changing world, not the disrupted.”

Calgary has long been a global energy centre and with the rapid development and application of advanced technologies, we have established ourselves as a leading centre for clean tech and the delivery of lower-carbon energy to the world.

The impact of digital transformation on the energy sector has been profound and it is accelerating as the industry emerges from the COVID-19 pandemic.

The economic strategy **Calgary in the New Economy** is the road map to our future. Its vision is for Calgary to be home to the brightest people who embrace advanced technologies and innovative thinking to resolve some of the world’s greatest challenges, including cleaner energy.

Scovan’s vision of **A New Energy** is to present a path forward on the transition to lower carbon and net zero emissions energy. It aligns with our vision for a dynamic energy sector that is a global leader, committed to providing affordable energy to people with a lower environmental footprint.



The companies that embrace digital transformation will be the disruptors in this rapidly-changing world, not the disrupted. Our province has an abundance of energy resources – from oil and gas to solar, wind and geothermal, to opportunities in hydrogen – but Calgary’s greatest attribute going forward is that we are a city of problem solvers.

The focus on environment, safety and governance – and application of technology – is what sets us apart and underscores the value proposition of Calgary’s energy innovation ecosystem. Calgarians have always shown a remarkable ability to take on challenges and prosper. Businesses from start up to blue chip, make up the entrepreneurial backbone and spirit that has made Calgary one of the most livable cities in the world. That is why we support companies like Scovan Engineering who challenge the status quo, and provide leadership in the energy transformation towards a greener future.

We can make a meaningful difference in the world by working together to resolve global challenges, starting right here in our own backyard.

Letter from the President

By Donovan Nielsen
President, Scovan Engineering

As we continue to make our way through these difficult times and face the challenges that Covid-19 is causing in our communities and around the world, it is so inspiring to see how people everywhere have adapted. Working remotely, learning from home, and gathering virtually to stay close to family and friends. We know that life will not always be like this and we are all looking forward to better days. Here at Scovan we feel a deep responsibility to keep on innovating and to keep making progress in an industry that enriches people's lives in a meaningful way. We are focusing on what we have been referring to as our Post Coronavirus Comeback Plan, or in some ways, the Re-Launch of Scovan.

You might think that it is strange that we are talking about a re-launch for a company that just celebrated its 10th anniversary. Scovan's biggest competitive advantage over the past ten years has been our nimbleness, responsiveness, and ability to adapt. It didn't matter if it was developing systems and processes as we executed the work for the first time, or aggressively ramping up to meet project workload demands, or dealing with the uncertainty that comes when commodity prices plunge, we've always been able to figure it out. The biggest single advantage during times of uncertainty is a company's ability to adapt and evolve.

“...the bigger
the challenge,
the bigger
the opportunity.”

We are facing a collection of unprecedented challenges including a global pandemic, public perception turning against the Canadian oil and gas industry, demands for better environment and social performance, and uncertain commodity prices. This does not mean there is not opportunity, but rather that the opportunity has shifted from what our industry has become accustomed to.

There is a monumental challenge ahead of us, but the bigger the challenge the bigger the opportunity.

Our team has been working to create a vision for what the future of our industry looks like and the role that Scovan will play in it. Today marks the start of this new journey. We plan to share several things with you including our purpose, values, and strategy to ensure that we continue to lead the industry with solutions as opposed to sitting back and hoping someone else does.

Calgary is a special place. It is where I have called home for the past 18 years. It is where my career started, where I have created my home, where my kids were born, and where our friends live. Calgary is a place full of hard-working people, entrepreneurs, and people that can make a difference. Scovan is proud to be in Calgary and proud that this is our headquarters from which we will influence the world. Let's be proud of who we are, where we live, where we work, and the opportunities ahead of us.

This magazine is intended to be our starting point of the next phase of Scovan's journey as we work together towards a New Energy. It's going to take a combination of Working Harder than ever, putting our

heads together to Figure Things Out, Disrupting How our Industry Does Things, and maintaining the Great Energy within our team.

Our roadmap to success includes innovation, technology, people, new types of projects, and lots of new opportunities. You can expect to hear much more on our plans and strategies. Our goal is to increase transparency and to create true dialogue through genuine and sincere communication.

At Scovan, we put our people at the center of everything we do. It means so much to us to play a role in the future of energy. A role that makes the lives of our clients simpler, more enjoyable, and better. And we couldn't be more proud of the amazing team that makes it all possible. The only way we will succeed is if we do it together. We are honored to be part of the most advanced energy sector in the world. This marks the start of a new era for Scovan. From all of us, thanks for joining us on this journey.

“The biggest single advantage during times of uncertainty is a company's ability to adapt and evolve.”

Donovan Nielsen, President, Scovan Engineering

Start with Purpose, Grow Strategically

“Our Purpose Statement, ‘A New Energy’, defines our inclusive culture, our dynamic approach to projects and our vision for a more sustainable energy future.”

Valerie Stewart, Director Business Development Scovan Engineering

A NEW ENERGY

 **> Figure it out.**

Disruption for the Better. 

Good Vibes. > Great Energy. 

Work > Hard. 

A NEW ENERGY. Clearly defining and articulating purpose can truly propel a company forward. Purpose helps set long-term business strategy, creates a bigger competitive advantage and differentiation in the marketplace, inspires innovation, increases brand loyalty and trust, and ultimately, helps the company stand the test of time.

Almost a year ago, Scovan engaged an internal task force to encapsulate Scovan’s purpose and core values. The intention was not to create new values, but rather to express who we are and what has made us special over the years. As a result, our purpose statement “A New Energy” was born. We also identified four core values as our guiding principles. These were: Work Hard, Disruption for the Better, Figure it Out, and Good Vibes, Great Energy.

Scovan’s values are not just words we use to motivate people. They reflect how we have recruited, how we execute our work, how we compensate and reward people, and how we make decisions now and in the years to come.

We are proud of what we have accomplished, who we are, and where we are going. With our values and innovation roadmap firmly in place, we feel fortunate to be in this unique opportunity to progress the world’s most advanced energy sector.

Strategic

Framework

Setting the tone and leading the way. Scovan’s Strategic Framework is composed of a unified vision, shared values and four strategic focus areas. Our strategy provides us with a method to define how our work supports the long term objectives and vision of our company. At a high level, these are the four key pillars of that Framework.



- Focus on Culture
- Diversity and Inclusion
- Developing our people
- Multi-discipline skill sets

- Leading the new technology ecosystem
- Accelerating idea generation to implementation
- Developing new sources of growth

- Rapid Deployment Strategy
- Digitalized Work Packages
- Initiate, Cultivate, Engage (ICE)
- Turnkey EPFC Solution

- Emerging Energy Industry
- Power Generation
- Water Projects
- Oil and Gas

Scovan’s Vision is to be the Canadian leader in providing innovative and sustainable solutions for the emerging energy industry, creating long term value for our partners. This means learning from the past, taking advantage of today, and being relentless for the future.

Leadership, Technology

and a Path to the Future

By Nima Peydayesh
Electrical Manager, Scovan Engineering

Innovation and technology have always been at the forefront of what Scovan does, but it is more obvious than ever that the energy industry needs to innovate at an even faster pace in order to succeed. One of the first things that Scovan did upon the start of Covid-19 was to launch an Innovation Task Force to identify what role specific technologies would play in the future. We believe each one of these disruptive technologies has the potential to play a role in the advancement of engineering in the next decade. The technologies that were researched included:

- Augmented Reality and Virtual Reality
- Artificial Intelligence
- Cloud Computing and Quantum Computing
- 3D Printing and Nanotechnology
- Automation and Robotics
- RFID's and Digital Commerce
- Block Chain
- Digital Twins



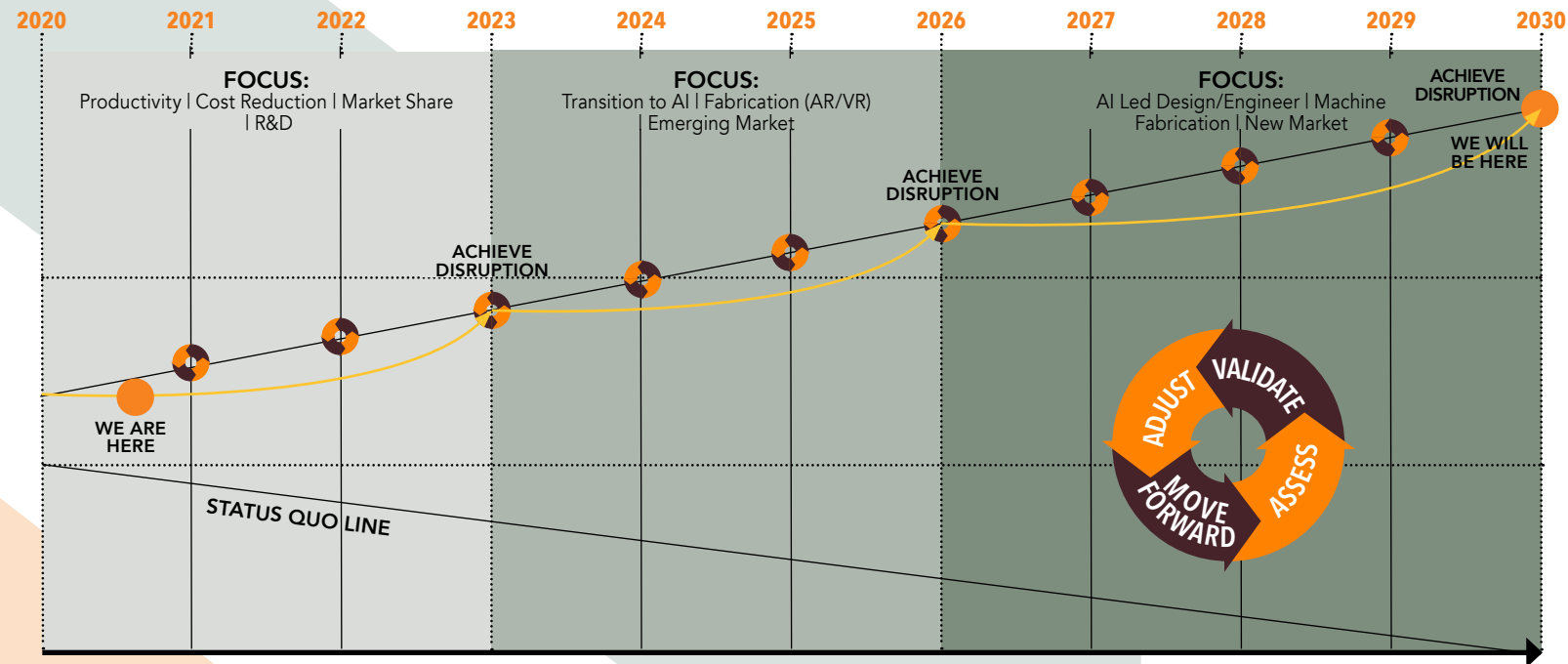
The future is coming faster than we realize. If it is possible for a Tesla to drive itself down the road, then the technology exists for us to make a significant difference in how we execute projects. The largest businesses in the world are all companies that have disrupted their industries using innovation. Just think of Uber, Netflix, Amazon, and Facebook. As costs of advanced technology decrease, adoption of those technologies will increase exponentially. For example, the average cost of a drone in 2007 was \$100,000, and today they are as low as \$280, and costs are certain to reduce even further. We are also seeing global trends towards digitalization, decentralization and decarbonization. These trends are key drivers to strengthen our business value chain and advance in areas that we can influence.

As a result, we have developed an Innovation Roadmap for Scovan to assist us in understanding what the future might look like, to set targets and goals, and to guide us as we develop next steps and investments. Our goal is to create action-based solutions that enhance economic prosperity, improve environmental quality and protect the social structures that contribute to our high quality of life.

“Innovation is not a department. It’s a mindset that is embedded in the actions of everyone.”

Jeff Reading, Director Innovation, Scovan Engineering

Innovation Roadmap



INNOVATION

SCOVAN INTENDS TO DEVELOP ITS INNOVATION ROADMAP IN THE FOLLOWING WAY:

- Explore the global innovation ecosystem to continue to build out our innovation roadmap for emerging technologies that are all incremental, transformative, and disruptive.
- Embrace the Cleantech Community (which is the largest in Canada) to define opportunities, build brand and develop diversity.
- Define criteria and processes to better align the synergies for new opportunities across the integrated group of companies, Scovan Engineering, Hive Innovations and Gemini Fabrication.
- Build communication relationships to better “tell the story” of the projects Scovan is engaged in.
- Develop a decision making, criteria-based approach for engaging emerging technologies to deciding which tech opportunities to engage.
- Contribute to the circular economy that is aimed at eliminating waste and the continual use of resources. Rather than the current take-make-waste model, the aim is to keep resources and their value in the loop and to rethink future business models befitting a more sustainable society.

Innovation goes beyond just technology and includes new ways of doing things. One of the areas in which Scovan continues to invest is Hive Innovations and true vertical integration.

Nearly five years ago we were evaluating what the best options for diversification were. We considered new clients, new types of projects, new services, and new geographical locations. But the solution that had the best opportunity was getting more involved in the projects that we already understand better than anybody. The vision for Hive was to offer vertically integrated solutions, on a lump sum turnkey basis, using templated designs. And from this vision

Hive Innovations was born. In October 2018, Hive acquired Gemini Fabrication, a well established fabrication shop in the heart of the Alberta Corridor and we once again furthered our vision. Gemini brings over 35 years of modular fabrication experience to the group of companies. This strategic acquisition has raised our game, and allows us to now offer turnkey EPFC services for clients seeking a full-service solution. This is just one step, albeit a critical one, in our innovation road map.

Our Innovation Roadmap involves both changing the way we think and operate and investing in and expanding technology. Hive is proud to have acquired two new product technology companies, HIPVAP and Orsico. Hipvap has developed an indirect fired steam generator (IFSG) technology and uses a lower heat flux to generate steam from untreated produced water. Imagine what one of our client’s SAGD facilities would look like if we were able to eliminate the evaporator system. Not only does this remove a major process system from the facility with a significant capital cost associated to it, but it also allows for better heat integration, reduction of large storage tanks for upsets, lower GHG’s, and the ability to further optimize the PFD. Orsil is a water treatment technology developed by Orsico that is capable of treating the blowdown from the Hipvap IFSG steam generator, but it is also capable of replacing crystallizers for evaporator waste treatment. Orsil was successfully pilot tested at Strathcona’s Lindbergh SAGD facility three years ago and is ready for commercialization. These products are an ideal fit for Hive and their focus on well pad scale solutions for the Oil Sands industry. Our collective vision is to create a well pad scale templated facility that uses Hipvap, Orsico, and our templated well pad designs to reduce the size and costs of developing new SAGD areas.

This is just the beginning of what we hope are great things to come.

AUTOMATION/
SCRIPTING

CROWD SOURCING

ROBOTICS

GENERATIVE DESIGN

OTHERS

INNOVATION TIMELINE

ARTIFICIAL INTELLIGENCE/
MACHINE LEARNING

VOICE RECOGNITION

DIGITIZATION

3D PRINTING

AUGMENTED (AR)/
VIRTUAL REALITY (VR)

IT/DATA SHARING

CLOUD COMPUTING

Raising the Bar with

Fresh Fridays

By Valerie Stewart,
Director Business Development Scovan Engineering

“Fresh Fridays brings our team together and empowers every person to find new solutions to our greatest challenges.”

Innovation doesn't just happen by itself. It needs to be intentionally part of a company's culture. We need to be thoughtful in creating an environment that promotes out of the box thinking and a safe environment in which to do it. What makes Scovan truly unique is how we invest in innovation, culture and new opportunities in the emerging energy industry. It is about fostering growth and empowering leadership within our team and being leaders in our industry. Fresh Fridays is one of the ways that we have chosen to invest into the future of Scovan.

Scovan has invested over three years into our Fresh Friday program. We have completed over 120 initiatives, achieved over 85% participation, created hundreds of new standards and templates, and have even been successful in attracting new clients. Nearly every person within Scovan has led a Fresh Friday initiative and every single person has contributed to multiple initiatives. It is this distributed thinking, intrapreneurship, and collaborative teamwork that continues to drive actionable results for our company and our clients.

Behind every great initiative is a great strategy. The foundation behind Fresh Fridays, and our Innovation Roadmap, is accomplished through our Initiate, Cultivate, Engage (ICE) initiative.

- The 'I' – Initiate – is to take action, to create and to cause change. It means to brainstorm, knowledge share and bring forth new idea in a relentless pursuit for new opportunities.
- The 'C' – Cultivate – is to create traction, create momentum and create excitement. It's about dedicating time and effort into research and development, growth and figuring out solutions that create positive results for Scovan and our clients and partners.
- The 'E' – Engage – is to captivate our team, our clients and our partners. With aligned goals, interests and purpose, we work together to drive the cause and ideas brought forward that can help shape the change and evolution of the new energy industry.



Fresh Fridays at Work

Fresh Fridays inspires creativity and helps us improve upon our standards, templates and processes. It also provides us with a low risk opportunity to onboard new clients which have innovative technology or unique energy solutions. An example of one of those new clients who participated in our Fresh Friday program is E3 Metals Corp. E3 Metals Corp is a lithium company who's goal is to produce battery quality lithium products to power the growing electrical revolution. Based in Alberta, they are developing a project on the backbone of the mature and sophisticated oil industry that will allow E3 to

catapult its development. E3 combines a significant resource and a well established local industry with their own proprietary direct lithium extraction (DLE) technology that have the potential to deliver lithium to market in one of the best jurisdictions in the world.

Our multi-discipline team at Scovan worked closely with E3 Metals to provide a technology review and feasibility study during Fresh Fridays. Scovan continued to work with E3 Metals in preparing their Preliminary Economic Assessment which received positive results for its 100% owned Clearwater Lithium Project. The PEA outlines the estimated production of 20,000 tonnes per year of battery-quality lithium hydroxide monohydrate over a 20-year period. This early engineering support set the ground work and critical steps for E3 Metals commercial development planning. At Scovan, we aim to create actionable results through Fresh Fridays. This includes making an impact on the early development cycle of up-and-coming firms and new technology in our province.



Boosting Clean Energy with AI

ABOUT DRISHYA AI LABS

Drishya's AI solutions for the Oil & Gas and Renewable Energy sectors leverage advances in computer vision, edge analytics, distributed deep learning algorithms and model driven control to provide advanced AI enabled solutions. Drishya's SaaS driven innovation strategy delivers rapidly scalable and deployable solutions with low adoption costs.

By Amardeep Sibia,
Founder & CEO of Drishya AI Labs (Calgary/Bangalore)

By the year 2025 Artificial Intelligence (AI) will have transformed every aspect of the energy business and delivered over \$800B of value across the energy value chain.

The world of energy is undergoing rapid evolution mainly driven by climate change and the resulting deployment of renewable energy resources that are distributed and variable in nature. This rapid change is leading to technology and business challenges for traditional oil & gas and renewable energy companies. Covid has thrown more headwinds and made the business environment even more challenging. These challenges include:

- Improving profitability
- Increasing productivity
- Extending asset life
- Optimising operations
- Enabling safer operations

Energy companies need to decarbonize, decentralize, automate & digitalize at an extremely fast speed in order to survive, sustain and compete in such disruptive times. This means that over the next 5 years, the business and operating models of energy companies and the energy ecosystem will undergo massive change. AI will be a critical tool enabling these changes.

AI algorithms make it possible for machines aka computers to learn from historic data and experience, adjust to new inputs and perform human-like tasks. In essence, AI enables systems to learn and understand context. This falls in two categories:

- a. Performing human-like tasks like seeing, conversing, reading, understanding, drawing, etc. Siri and self-driving cars fall in this category.
- b. Identifying and dealing with variances in vast datasets which may be beyond the ability of the human mind to comprehend and assimilate. High-frequency sensor data from a sensor rich environment is an example.



Traditionally, tabular data used to be the only form of data used in analytics and data models. AI is now enabling multiple forms of unstructured data to be converted into insight, information and action. Datasets now include images, video, sound, voice, documents, social media, etc. This allows companies to tap into massive amounts of knowledge stored in the form of documents, reports, chats, etc.

This combination of AI and Machine Learning (ML) techniques, AI/ML native applications that would not exist without AI/ML algorithms and the unlocking of non-traditional datasets enables companies to achieve:

- Greater efficiency by enabling faster execution with lower error rates at lower costs
- Higher capacity by enabling higher volume of higher quality work to be executed
- Finally enabling newer channels for revenue

AI and digitalization can lead to exponential and innovative growth for companies. The following case studies illustrate how AI can power innovative businesses.

- Ant Financial is Jack Ma's 8 year old digital financial services company spun-off from Alibaba. Its planned, albeit delayed \$34.5B IPO will be the largest in the world overshadowing Saudi-Aramaco's. Ant sells financial products like loans & insurance and financial services like portfolio management, trading and financial advice.

The reason Ant Financial is valued so highly when there are so many other financial services companies comes down to how it has built AI into its operations from the ground up. Its adoption of AI has enabled it to offer its services to 10 times as many customers as other companies at 1/10th the cost as compared to its competitors. So Ant can expand into new markets and geographies much faster compared to its competitors.

- AI enables Adidas to provide personalised sneakers to its customers who can change the material, colour, logo, etc. of their sneakers. Using AI, Adidas is able to incorporate production of these highly customised sneakers into Adidas' normal production line without manual intervention and ship the sneaker to the customer within 10 days without any additional cost to the customer.
- Bottomless.com delivers fresh ground coffee powder to their customers' homes through a subscription model. They send a small wifi and IOT enabled weighing scale to the subscriber. The subscriber is asked to store their coffee bag on weighing scale. The scale enables Bottomless.com to measure coffee consumption and its AI algorithms order and ship freshly ground coffee from the nearest coffee supplier at the right time ensuring waste reduction and higher customer satisfaction and profitability.

These three forces of AI which power incredibly fast, super economical and hyper scalable operations, allow extreme customisation and personalisation and enable new sensor and data based business models, will act as catalysts for ground breaking transformations in energy businesses. Some areas where AI will have an enormous impact are :

Completely autonomous oil & gas wells and plants. AI coupled with sensors and digital controls will monitor, control, manage and optimise these wells and plants. AI will assist in predictive maintenance of these operations and lead to greater efficiency, productivity and lower operating costs. Operators will supervise these wells and plants remotely using cameras, drones, computer vision based surveillance and augmented reality enabling safer operations. Speedier and predictive AI controlled autonomous operations will enable cleaner energy extraction leading to lower emissions.

Highly dynamic power generation, transmission and consumption. As installs of variable renewable energy resources becomes prevalent and electric vehicles become more widely adopted, the supply and demand for power will fluctuate widely. Supply from solar and wind based sources will change by the minute due to local weather conditions. Demand will be highly mobile and



variable as hungry power consumers like EVs can appear without any notice. Additionally, a person who has installed renewable power can change from a consumer of power to a supplier of power in seconds. This highly dynamic environment would require billions and billions of decisions to be made.

AI will enable the huge number of complex decisions to be made and executed for monitoring operations, profiling, controlling and smoothening power consumption and make optimal decisions to buy, sell, store or trade power depending upon forecast demand and supply.

Digitalized business of energy. Bots and digitalization will improve productivity and efficiency of business execution across every aspect of business operations be it engineering, finance, HR, marketing or logistics. AI will assist in managing risks and automating tasks across the design, build, commission and operate phases of energy projects. Conversational AI bots will respond to routine queries and speed up communications. Digitalized workflows will reduce errors and highlight risks to ensure that real-time value of energy assets is maximized.

All said and done, AI technology has strong potential to transform the energy industry in all areas – upstream, midstream, and downstream. But to ensure success, the barriers between data silos need to be broken and employees reskilled for an AI-enhanced future. Energy companies that learn to adopt and adapt to Artificial Intelligence will attract capital and talent, deploy ground breaking innovations and become the titans of Clean Energy.



“A team you can count on. A product you can trust.”

Gemini Fabrication award winner for “Best Fabrication Company 2020 – Western Canada” by Build Magazine. This award is given annually to a fabrication company that demonstrates expertise within a given field, dedication to customer service and client satisfaction, and an ongoing commitment to excellence and innovation. Setting the standard in Western Canada, Gemini Fabrication is the industry leader in well pad, well pair fabrication.

Gemini also provides fabrication and packaging services for all components of a central processing facility for conventional oil and gas and SAGD projects.

HIGHEST SAFETY STANDARDS + QUALITY + EFFICIENCY + TIMELY DELIVERY

At Gemini Fabrication, we are committed to delivering economically viable solutions by planning projects with constructability in mind. Our goal is to create a partnership, as we believe it is not the contract in place, but the contractor you have in place.





Building for the Future by Evolving the Way We Work Today

Our Process

At Scovan, Engineering is our passion, but creating an exceptional client experience is our highest priority. We take the time to understand our clients needs and provide them with value added solutions, which is why 90% of our clients are repeat customers. We build trust and loyalty from start to finish.

PROBLEM IDENTIFICATION & EARLY ALIGNMENT

We work closely with our clients to fully understand their objectives while maintaining safety, environment, cost, and efficiency top of mind.

PROJECT DEFINITION

This creates a basis for the project, including cost estimating, scheduling, and creating a detailed engineering deliverables list.

STRATEGY DEVELOPMENT

Creating a work execution strategy that is fit-for-purpose that doesn't necessarily follow the status quo. Scovan actively seeks to incorporate a unique value added approach every step of the way.

At Scovan, we invest in continuous improvement to stay ahead of the curve to deliver the most cost-effective solutions for our clients. From our Digitalized Work Packages and Rapid Deployment Strategy, we deliver cutting edge methods and proven results.

Over the last decade our team has delivered over 600 projects in North America, \$2 Billion in total project value, equipment and services and provided a 30% reduction of GHG emissions through onsite Power Generation and Heat Recovery. Our designers and engineers have the technical expertise to offer innovative solutions for any of your traditional or renewable energy projects.

Our Approach

At Scovan, we generate positive results for our clients through our unique and innovative approach to engineering. Our dynamic company thrives on opportunity by providing solutions to complex problems and delivering breakthrough results with an impressive track record to back up our claims.

COST CERTAINTY

We scope our projects from start to finish to create complete solutions for your project. Fixed engineering provides cost certainty while allowing our team to focus on the end goal, without unpredictable change orders.

AGILE WORKFORCE

We employ full time staff to keep our intellectual capital in house, and develop a highly skilled and trusting environment amongst our team.

DIGITALIZATION

Our workforce is on the move, and so are we. We provide real-time access and full transparency on the status of our projects.

QUALITY ASSURANCE

Quality of our work is at the core of what we do and is a non-negotiable. We have extensive yet practical quality control methods that relies on developing the competencies of our team.

APPLIED LEARNING

At Scovan, we are driven by continuous improvement and raising the bar. We are committed to setting new standards by ensuring that we capture suggested improvements in our Lessons Learned database as part of our routine project status updates.

Breaking from the Energy Herd

By Graeme Edge,
Co-Founder of the Energy Disruptors: UNITE event series

“Oil and gas companies are looking at the emergence of the hydrogen economy.”

Governments globally are lining up to set ambitious climate targets for the mid-part of this century. Significant recent “net zero” CO₂ announcements from China, Japan and South Korea are countering much of the climate narrative coming out of the United States.



What we are seeing play out is a geopolitical dog-fight for 21st-century energy supremacy between traditional petrostates and China, which looks to become the world’s dominant electrostate. China is uniquely positioned with a huge domestic market, manufacturing expertise, rising R&D capability and globally recognized brands. (Look no further than Huawei and Xiaomi.) It is aiming to dominate the hardware, software and data businesses for future renewable energy, transportation and industrial electrification. The emergence of new sharing business models led by Didi Chuxing, a ridesharing company, is further accelerating these trends.

Many commentators, energy analysts and leaders at incumbent oil and gas companies are either failing to see the tectonic shifts happening or they see the trends but don’t know how to respond. Often the counter argument to this increasingly electric energy future is increased global economic activity, further industrialization in Asia, and rising consumer demand for things such as plastics will make all energy boats rise, oil and gas included. This is a risky strategy. A better solution is for exploration and production (E&P) companies to first look inward, not outward, before they miss the opportunity to work a changing landscape to their advantage.

Most E&P companies have been so busy surviving that they haven’t looked up long enough to see the wood from the trees. The “wait for prices to recover” strategy of the past five years has not paid off and is unlikely to do so. Capital for publicly traded oil and gas companies is getting more expensive. Stakeholders are increasingly pressuring university endowment funds and other sources of investment to divest from hydrocarbons. Institutional investors such as BlackRock are signaling that major improvements are needed from the oil and gas industry on environmental, social and governance issues and emissions reductions. Many large E&P companies have responded with vague “net zero” announcements that contain little detail on how to achieve this. Public perception is increasingly skeptical, and actions must replace words.

Reliable ESG data is sorely lacking and it’s not clear how future CO₂ improvements will be recorded, verified or audited. A global price on carbon is long overdue to level the energy playing field and mitigate CO₂ leakage from the West to the developing world.

With a new generation of internet and social media savvy young people increasingly voicing their frustration, the climate change narrative has morphed into the climate crisis dialogue. Against this backdrop, voices promoting a divestment from fossil fuel are only increasing in volume, potentially causing a vicious spiral in capital costs in years to come for both public and private oil and gas companies. The unintended consequence of all this could be to push future hydrocarbon investments and greater supply from the West into the hands of national oil companies in parts of the world that have little to no environmental legislation, monitoring or enforcement, ultimately increasing global CO₂ emissions.

In many ways, hubris exists on both sides of the climate and energy debate. Staunch oil and gas proponents view climate change advocates as naive, arguing new renewable energy technologies are fraught with high costs, technical problems and a lack of energy density. And indeed many hardcore transition proponents – some calling for the total eradication of hydrocarbons – are poorly versed in the economic and geopolitical realities of the global energy supply chain: Much of it will be impossible to decarbonize without significant technological, economic and regulatory breakthroughs. The transition will take decades, play out at various paces across different regions and be fraught with complexity.

What should E&P companies do about all of this? To begin, they must go beyond their peer group for examples of leading-edge thinking, ambition and execution. Boards and executive teams are split into three groups: the traditional “do what you know best” camp, leaders sitting on the energy transition fence, and increasingly loud voices calling for decisive action around business transformation. The latter group is still outnumbered. In many ways, leaders are afraid to step out from the herd mentality that has been prevalent for too long in the industry.

With the majority of oil and gas boards heavily weighted with current and former industry veterans, diversity of opinion is sorely lacking. Existing boards are in desperate need of overhaul – as are the traditional executive search firms that serve them and continue to hire in their own image. Younger, more diverse board members are sorely lacking. Creativity, customer-centric design, digital technology transformation, electrification market knowledge and strategic pivot expertise are essential for future success.

Boards are understandably nervous about the viability of diversifying into new low carbon energy investments. There seems to be little crossover between running an oil and gas company and trying to build a renewable energy business. How do they compete with incumbent utilities and entrepreneur-led entrants that are more knowledgeable about global power markets and emerging trends – including virtual power plants, distributed energy resources and digital grid innovations – and have deeper consumer-facing business expertise?



Oil and gas companies are looking at the emergence of the hydrogen economy as a possible saving grace that would enable them to play to their fuel-based engineering strengths and competency in developing complex processing and distribution infrastructure. Another area of considerable opportunity is scalable technology-based solutions in carbon capture, utilization and storage, and potentially selling this expertise to other industrial polluters and competitors.

There are no clear answers on how best to respond to the current crisis facing the industry, but the first step should be the rejuvenation of oil and gas company boards and leadership teams. A bolder, more diverse and inclusive future vision for the industry would not go amiss either.

Written for Scovan Engineering, and published in the Globe and Mail November 9, 2020.

GRAEME EDGE is a Calgary based entrepreneur, co-Founder of the Energy Disruptors: UNITE event series and CEO of ScaleBlaze, a specialist energy transition and clean energy executive search firm.

Lithium – Alberta’s Future is Electric

By Chris Doornbos,
President & CEO of E3 Metals

“ We study history not to understand the past,
but to anticipate the future.”

90 years ago we witnessed a pattern of human behavior that we see happening again today. What was that pattern? Disruption, economic collapse, and renewal. More specifically, we saw disruption in advancements such as Henry Ford’s assembly line; we experienced economic collapse in the great depression and; we saw renewal in policies and plans such as Roosevelt’s new deal. Disruption. Economic collapse. And, renewal.

Today we are witnessing a similar pattern. We see disruption, led by the innovators of our time such as Steve Jobs and Elon Musk. Collapse is evident around the world in the current global crisis. What will renewal look like? Whatever that renewal is, however it presents itself, it will certainly be different from anything we have seen before.

ALBERTA: THE FUTURE IS NOT IN THE REARVIEW MIRROR.

For 75 years, we in Alberta have defined ourselves as an energy province, focused on oil and gas. That has been our core business and that is not going anywhere. Successful adaptation builds off of proven practice, rigorous debate, expansive thinking and focused effort. Here in Alberta our greatest opportunity will be to leverage off our core business – our experience – and profound knowledge of the oil and gas industry. Not to replace that core business but to amplify our offering.

Diversification and this pending renewal is critical to Alberta’s economic future. My team at E3 Metals is building on the backbone of our oil and gas expertise, offering Alberta the opportunity to participate in a growing new sector - the lithium-ion battery. We look to produce lithium in much the same way we produce oil, feeding this new market and creating jobs from within the province’s existing workforce. The size of this opportunity is massive – Alberta holds vast lithium resources across the province that are in the same size paradigm globally as the province’s oil reserves.



E3 Metals’ proprietary technological advantage extracts lithium from brines in Alberta that are enriched with this critical metal. Our goal is to produce high quality lithium products for direct sale into the growing battery market. A bigger goal is to do so with net-zero carbon emissions by utilizing local technology and know-how.

Canada is one of a few countries that has within it all of the essential minerals to supply the growing global trend to electrification. In fact, Alberta alone could supply cobalt, nickel and soon, premium quality lithium. I believe that Canada in the near future may compete head to head with China in the production of minerals essential to the electrification revolution.

Our industry and province are facing challenges like we have never seen. **CHANGE IS INEVITABLE.**

The challenge for all of us is to build the tools to anticipate and meet this change head on and to generate opportunities for the future.

ABOUT E3 METALS CORP.

E3 Metals is a lithium development company with 6.7 million tonnes of lithium carbonate equivalent (LCE) inferred mineral resources¹ in Alberta. E3 Metals is currently advancing its proprietary direct lithium extraction (DLE) process in partnership with Livent Corporation (NYSE:LTHM), a global leader in lithium production, under a joint development agreement. Through the successful scale up its DLE process towards commercialization, E3 Metals’ goal is to produce high purity, battery grade, lithium products. With a significant lithium resource and innovative technology solutions, E3 Metals has the potential to deliver lithium to market from one of the best jurisdictions in the world. E3 Metals also continues to work with partners at the University of Alberta and at GreenCentre Canada. For more information about E3 Metals, visit <http://www.e3metalscorp.com>.

Advancing Artificial Intelligence

in the Oil Sands

By Oliver Kohlhammer,
Engineering Manager, Scovan Engineering

Oil & Gas companies are seeing an increase in adoption of digital technologies like Cloud Computing, Big Data Analytics, Edge Computing and Artificial Intelligence for production activities to remain competitive in the current low demand & high volatility market. Utilization of Artificial Intelligence / Machine Learning (AI/ML) as tools in Oil & Gas production operations has allowed tracking of large datasets with parameters and patterns ranging far too wide for detection via human observation.



Scovan and Drishya AI have engaged one of our forward-thinking clients to jointly develop an Artificial Intelligence solution for their SAGD Facility. Scovan's engineering expertise along with Drishya AI's smart Artificial Intelligence solutions, makes a uniquely suitable solution for assisting our clients in their efforts to increase efficiency and reduce costs. This will be accomplished by operational optimization, reducing wastage, and scheduling advanced maintenance for both current and predicted future failures. Ultimately creating a more environmentally responsible and cost-effective operation.

Evaporator operations are a major component of operating costs for a SAGD facility and are the key component to eliminating the need for fresh make-up water for operations. Evaporator systems allow for the produced water that is a part of the emulsion to be treated such that it can be reused to generate steam. It is estimated that the operation of an evaporator system for produced water

treatment makes up a significant portion of the overall operating cost of a SAGD facility. The AI solution being developed for our client is focused on the performance optimization of the evaporator process system. Operators are often faced with the problem of negotiating sudden changes in operating conditions. The water treatment and steam generator network consist of several process units which require operator input. Skilled operators are able to maneuver plant set points based on their experience and judgment. Operators now require tools, such as AI, which can guide them towards the optimal operating point and adjust performance constraints for regularly optimized energy consumption. There is so much data that goes unused that can aid the efficient

operation of these systems. The solution unifies evaporator data and cloud based Artificial Intelligence platforms for optimising distillate production by improving the evaporators operation, produce water management, fouling management and chemical use.

Where AI tests have failed in the past is where there is not a great enough understanding in the operation to properly train the system to replicate and improve upon the decisions that are made. This joint project is designed to overcome the challenges that past AI projects have had in the Oil and Gas industry. The project will result in significant operational cost savings, reduced downtime, and lower GHG emissions for our clients.

The project is anticipated to go live in Q1 2021.



**FUELING INNOVATION.
DRIVING VALUE.**



In a world of complex problems, HIVE Innovations is “Challenging the Business of Energy”.

Hive was formed to bring together a collective of proven industry experts with an ultimate goal of increasing the value of assets through innovative designs and a flexible commercial model. Our vertical integration achieves efficiencies and above average productivity through a single point of responsibility for engineering, procurement, fabrication, construction and commissioning.

We simplify the process from concept to commissioning by investing in standardized templated and repeatable designs, Steam and Water Technologies, Thermal Wellpads, Infill Wells, and Wellpairs. We have industry leading designs and implementation strategies to make your project a success. Let's talk.

Challenge & Resilience

By Alysia Rissling
Bobsleigh Pilot at Bobsleigh
CANADA Skeleton

Imagine standing outside at the top of a mountain. It's -20C and you are wearing just a thin spandex suit, but you feel no cold. All you feel is the anticipation and nerves flowing through your body, it's almost as if you are vibrating. The crowd is going wild, screaming and banging drums and cowbells, but you can't hear them through the motor cycle helmet covering your ears. You can't hear them, because the only thing louder than the crowd is the thoughts racing through your mind. Trust me – nothing is louder than the thoughts racing through your mind when standing on the start line at the Olympic games.

The clock goes "bing bong", the sled gets flipped into the grooves on the ice and after smacking your teammate on the back you walk to the push bar. You hear the call and you start to push. It's 30m of all out effort to get the 375 lb bobsled accelerating as fast as you can. You jump in and let the air out of your lungs. It's almost impossible to breathe in the five seconds you are pushing. That breath transforms you from this mega powerful running back into the quick thinking quarterback because caressing the bobsled down the track is all about feeling, anticipation and finesse. The difference between bobsled and football is that in bobsled, we don't fight for inches, we fight for hundredths. There are no brakes as the sled accelerates down the mountain. It's 16 corners of twists and turns. Left steer, right steer, pull back, shoulder roll. The key is to not steer the sled but resist the centripetal force as the sled climbs into the corner. Until, you cross the finish line and frantically scream brakes for your team mate in the back to get the sled to come to a complete stop. Then, and only then, you remember to breathe.

What I want to talk about in this article are the thoughts that race through your mind when you are going through what you perceive as the biggest challenge in your lifetime. During this challenge, are the thoughts simple and positive? "I have done the work, I am ready". Or, are the thoughts filled with all of the should have, would have, and could have? These thoughts are inevitable, but what is crossing your mind and whether or not they are positive or negative, has to do with how confident we are in ourselves to deal with challenges. It has to do with our ability to be resilient.



2020 has been one of the most challenging years on record for many people. Some days are easier to overcome than others. If there is one good thing to come from 2020, I believe it will be resilience. I've come to realize in my past 8 years of bobsledding, including a trip to the Olympics, is that resilience can be one of the most important qualities you possess to help you achieve your goals.

My first challenge, while trying to achieve my goals, is my body. In my sport, everything is always a competition. Who can lift the most weight, run the fastest, push with the most velocity, drive the smoothest, and be the leanest. Now in my 30s, I've discovered the challenge of my body is more about deciphering when it's appropriate to push myself and when to rest. My relentless drive to be the

hardest worker in a room has been one of my biggest downfalls and is one of the reasons I was sidelined for the 2019/2020 season thanks to a 7 cm tear in my calf. Caring for our bodies is more than always pushing it to be perfect, or not pushing it enough. Caring for your body is about keeping it running as a well-oiled machine. Mobility, recovery, symmetry – because you can be the strongest person in the room but if you can't move, you can't compete. A body that isn't well cared for can not be resilient.

I'm challenged by the perception of others. During quarantine many of our interactions were limited to behind a screen. Zoom meetings and social media are incredible ways of keeping us connected, but it makes it easier for us to convey a version of ourselves that we want people to see, and maybe doesn't tell the whole story. Personally, I couldn't be happier of all the people who reached out to me over

the lock down on Instagram. These are people I have never met, from all different backgrounds, around the world spilling their soul and thanking me for keeping them motivated. What I had to share back was that it was those kind messages that kept ME motivated, and I was struggling just as much as they were. This is one of the important messages I try to convey to the students I mentor through the organization Classroom Champions in Fort St. John. I make it very clear to them that even though it looks like I'm always smiling, sometimes inside I am facing big emotions, and by acknowledging and expressing those feelings in an appropriate manner, it helps to make me more resilient.

I'm challenged by doubt. Back to those voices in your head- the little ones whispering in those big moments. Is the voice yours? Or is it someone else's? Personally, if I can hear someone else commenting that I can not or should not accomplish something I use it as motivation. I believe that no one has the right to put limits on your potential, and a person out to prove someone else wrong is dangerous. But if that voice of doubt you hear is your own, it can be scary. Self doubt, a lack in confidence, most often comes from a lack of preparation. When I have a big moment coming up,

I always start a checklist of the things I can do that will help me feel more confident when the moment arrives. This helps to reduce or eliminate the should have, would have, and could have. There are always going to be extra challenges along the way that prevent us from feeling totally prepared, but if you can focus on the things in your direct control, it will make you more resilient.

Covid-19 has taken so much of the control away from us. The uncertainty of our futures has been the biggest source of stress for most people. By focusing on the things you can control, and trusting that you adapt, I really do believe that this experience will make us all more resilient. We are in this together!

I would like to acknowledge Scovan Engineering for being my biggest supporter for the past 5 years. Thank you for putting so much back in my control during these challenging times.





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