

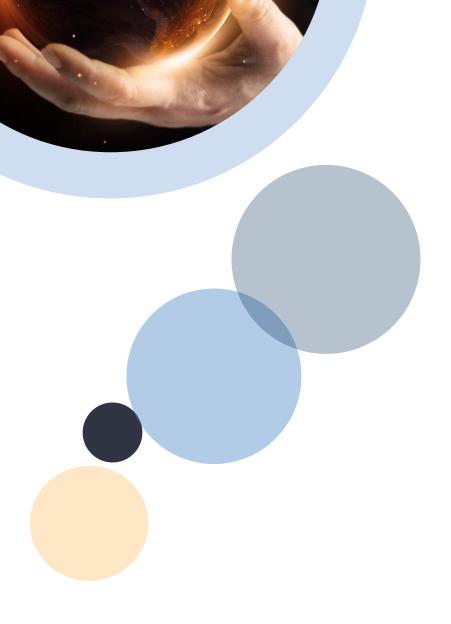
## BRUCE INNOVATES

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Foundational Hydrogen Infrastructure Project



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## **EXECUTIVE SUMMARY**

A significant opportunity exists for the Bruce region to produce clean hydrogen from clean nuclear and renewable electricity, and in doing so, position it to not only contribute to, but also to benefit from, the transition to a low-carbon economy. To take advantage of this opportunity, Bruce County and Saugeen First Nation have launched an initiative called "Bruce Innovates: Foundational Hydrogen Infrastructure Project".<sup>1</sup> The project aims to transform the Bruce region into the Clean Energy Capital of Canada by establishing a world-class region for collaboration and training in clean technology development and innovation.



Bruce Innovates has the potential to be a ground-breaking and innovative way to pursue multiple objectives simultaneously, including:

- 1. Developing, testing and scaling-up hydrogen-based energy systems by undertaking pilot projects before eventually progressing to larger-scale commercial technologies;
- Diversifying and boosting the economy by growing a hydrogen economy and creating export opportunities, whilst supporting entrepreneurship, clean-tech business development, job creation and next generation career development;
- Supporting Saugeen First Nation (SFN) and other First Nation communities in building capacity towards greater energy self-sufficiency – by developing hydrogen-based onand off-grid energy systems; and
- Accelerating the commercial deployment of Canadian-based hydrogen technologies both nationally and abroad – by marketing utility-scale hydrogen production and energy storage technologies.

To this end, Bruce Innovates is looking to form a strategic partnership to achieve the key goals of this opportunity. Having partner support will help advance this initiative through the critical first stages of project development, including:

- Developing a technical and economic feasibility study of the proposed project; and
- Advancing project planning and initial demonstrations of hydrogen technologies.

<sup>&</sup>lt;sup>1</sup> Bruce Innovates marks the first major transformational project of a broader umbrella initiative called "Project Innovate", the goal of which is to transform the County into an innovative energy supercluster within ten years.



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## FOREWORD

The Bruce region has the economy, location, natural resources, readiness to build and project partners required to become a leader in clean hydrogen technology, research and innovation. The area also demonstrates several important characteristics for attracting investment, including:

- A culture and support system that nurtures skills training and entrepreneurship in the energy sector;
- A multi-year partnership with Bruce Power, which has created an energy cluster of world class intellectual talent; and
- Global recognition for being a leader in zeroemissions power generation from nuclear and renewable sources.



Bruce Innovates has a unique opportunity to leverage these strengths to build a sustainable energy supercluster and utilize existing assets to diversify into alternative industries. The County recognizes that hydrogen can support these targets and has a vision for Bruce County of being a world-class energy hub at the forefront of hydrogen technology and clean energy innovation in Canada.

A feasibility study that assesses Bruce Innovate's plans to advance foundational hydrogen infrastructure would help establish the foundation on which to move the project forward in a methodical, proactive way.

Mitch Twolan, Bruce County Warden



Lester Anoquot, Saugeen First Nation Chief



## **ENDORSEMENTS**



"Along with nuclear, hydrogen will play a critical role in next generation clean energy technology. Bruce Power welcomes this initiative and recognizes it as an important step towards transitioning to a low-carbon energy system that will help Ontario and Canada with solutions needed to meet climate change goals."

## James Scongack, Executive Vice President Corporate Affairs & Operational Services, Bruce Power



"Bruce County is building on its strengths as a sustainable energy region to become a leader in Canadian clean energy. Hydrogen technologies are a welcome addition to an already diverse mix of energy companies located here, and this work is well aligned with our work at the Nuclear Innovation Institute – which is accelerating the pace of nuclear innovation to drive the shift to a low-carbon future."

#### Bruce Wallace, President, NII



"Bruce County, endowed with underground geologic formations capable of storing vast amounts of hydrogen, in addition to being home to the largest operating nuclear facility in the world, makes it a natural place to advance energy transformation and establish itself as a leader in hydrogen technologies. These types of next generation initiatives are essential to electrify transportation, agriculture, industry and heating sectors in the coming decades."

#### Robert Stasko, Board Chair, Hydrogen Business Council



"OCNI represents more than 220 Canadian suppliers to the nuclear industry in Canada and offshore. Our vision is to "lead and strengthen a thriving Canadian nuclear supply chain" through innovation and leadership. OCNI works closely with Bruce Power and Bruce County in driving economic development in the region. We believe that Bruce County has unique advantages to become a world-class innovative energy hub and is well positioned to be at the forefront of hydrogen technology development and implementation in Canada."

Ron Oberth, President and CEO, Organization of Canadian Nuclear Industries (OCNI)

## PART 1 – WHY HYDROGEN?

### Decarbonization of the future energy mix

#### Hydrogen is a clean fuel



As regions are exploring options to transition to a low-emissions energy future, hydrogen is emerging as a strong complement to existing options and market forces



A confluence of technology improvement and business needs have reinvigorated the optimism on hydrogen economy

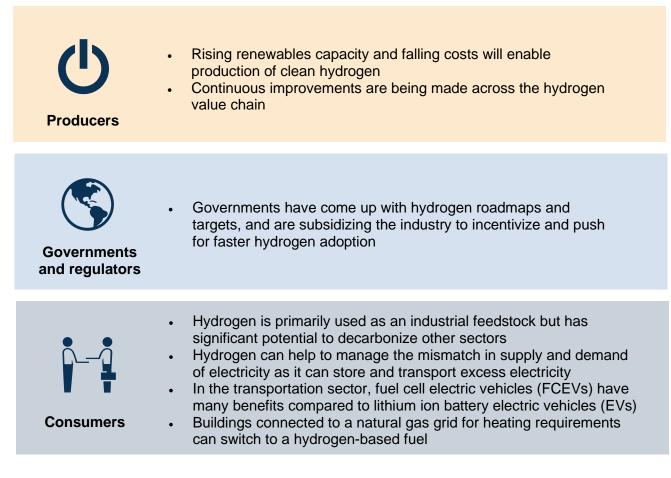


The narrative for hydrogen is changing from technological development to market activation



Hydrogen is envisioned to be produced from carbon free sources in the medium to long term

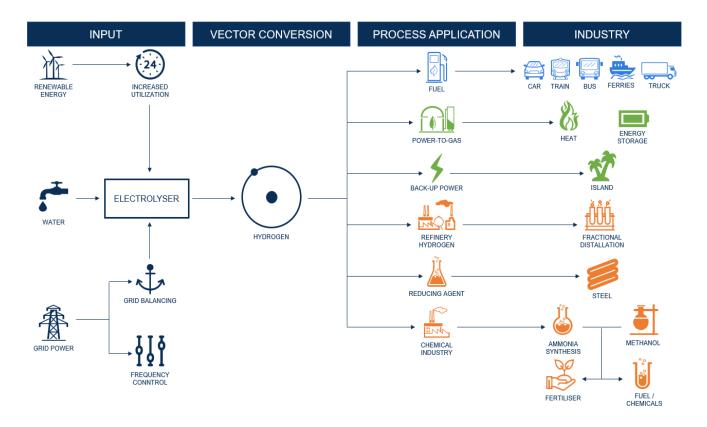
#### **Relevance for multiple stakeholders**



### Hydrogen production and end-use applications

Hydrogen production: In a process called "Power-to-Gas", electricity ("Power") is fed into an electrolyser, which is a device that uses the electricity to split a water molecule ( $H_2O$ ) into oxygen ( $O_2$ ) and hydrogen ( $H_2$ ) gas ("Gas").

Hydrogen's end-use applications: Hydrogen presents a unique value proposition in that one hydrogen production facility can enable multiple end uses, including electrical grid stability, decarbonization of the gas grid system, fuel for vehicles and industrial processes.





### The Bruce Region advantage

The Bruce region is an ideal location to develop and deploy hydrogen technologies. The combination of substantial zero-emission electricity generation capacity, favourable geological formations and strong project buy-in from stakeholders, makes the area uniquely positioned to lead the clean energy transformation for Canada.



The Bruce transmission zone produces significantly more electricity than it currently consumes, and would benefit from having this excess energy used in the production of hydrogen

The Independent Electricity System Operator for Ontario (IESO), responsible for managing the electrical grid system, specifically identifies the Bruce region as a viable location for Power-to-Gas processes (IESO Report – Energy Storage, March 2016). The Bruce transmission zone is capacity congested (meaning that the transmission system is unable to absorb the large amounts of off-peak power generated from nuclear and renewable sources), but Power-to-Gas could help alleviate this pressure on the grid by withdrawing large amounts of energy to power the production of hydrogen.



#### Bruce Innovates would be the first project to demonstrate the capabilities of Power-to-Gas in a capacity congested transmission zone

With Bruce Innovates, Ontario would experience for the first time the benefits of having a Power-to-Gas facility in operation in a zone that is classified as 'capacity congested'. Currently, the only Power-to-Gas facility in operation belongs to a zone that isn't – this would be the Enbridge and Hydrogenics' Markham Energy Storage Facility, which operates in the Toronto zone. As such, Bruce Innovates has a unique opportunity to demonstrate the potential for hydrogen production to alleviate pressure on the grid from excess nuclear and renewable energy – a value proposition which will become increasingly evident as the province, and the rest of the globe, moves towards increasingly higher levels of zero-emissions power sources.



## The Bruce region features underground formations that are ideal for storing hydrogen gas

The Bruce region is endowed with underground geologic formations that enable the storing of vast amounts of hydrogen. The integration of hydrogen storage in geologic reservoirs is envisioned by the Canadian Nuclear Laboratories (CNL) as a unique Canadian technological opportunity that could enable significant de-carbonization across multiple sectors not only in Canadian markets, but globally as well.



#### The Bruce region can provide an abundance of offpeak emissions-free energy that can be used to power the production of 'clean hydrogen'

The Bruce region generates an abundance of nuclear and renewable energy at off-peak hours, which enables the production of 'clean' hydrogen since nuclear, wind and solar are carbon-free sources of power.



# Bruce Innovates is determined to unlock the tremendous potential that hydrogen has for diversifying and stimulating the local economy

Bruce County and Saugeen First Nation have already made significant progress towards establishing the program framework and technological requirements for Bruce Innovates. Conceptual designs have been discussed, a Steering Committee is under way, demonstrating that project leadership and stakeholder buyin is strong.

### Hydrogen projects – case studies

This section highlights a sample of hydrogen projects that are currently active across the globe. The projects that have been selected represent the different parts along the evolving hydrogen value chain, but what they have in common is that they stimulate entrepreneurship, nurture clean-tech business development, create jobs, encourage innovative skills advancement and spark growth opportunities for the private sector.

Through Bruce Innovates, the Bruce region has an opportunity to become a key player in this new, promising, and global hydrogen value chain.

Enbridge and Hydrogenics' Markham Energy Storage Facility The Markham Energy Storage Facility, owned and operated under a joint venture between Hydrogenics and Enbridge Gas Distribution, is now providing regulation services under contract to the IESO of Ontario. Hydrogenics' Power-to-Gas technology is transforming the energy sector through the production of renewable hydrogen for zero-emission FCEVs (train, bus and truck fleets) or other applications while providing grid services to System Operators around the globe.

Source: <u>https://www.hydrogenics.com/2018/07/16/north-americas-first-multi-megawatt-power-to-gas-facility-begins-operations/</u>

Air Liquide Canada's hydrogen electrolysis plant in Quebec Air Liquide will build in Bécancour, Québec, the largest Proton-Exchange Membrane (PEM) electrolyser in the world with a 20 megawatts (MW) capacity for the production of low-carbon hydrogen (the facility will use hydropower). Bécancour's proximity to major industrial markets in Canada and the United States will play a key role in the supply of low-carbon hydrogen for both industry and mobility usage in North America.

Source: https://www.greencarcongress.com/2019/02/20190226-airliquide.html

Germany's REFHYNE Project with Shell and ITM The 10MW REFHYNE electrolyser has been designed as the building block for future electrolysers up to 100MW and beyond. It is scheduled to be operational by 2020 to provide bulk quantities of hydrogen for refinery processes and will also explore applications in other sectors including power generation, heating for buildings and transport.

Source: https://refhyne.eu/

#### California's Hydrogen Fueling Infrastructure

Through its Assembly Bill No. 8 program, the State of California co-funds the deployment of at least 100 hydrogen fueling stations to enable the launch of a consumer fuel cell electric vehicle (FCEV) market. AB 8 dedicates up to \$20 million US per year to support continued construction of the stations. In addition to AB 8, the recently-updated Low Carbon Fuel Standard provides strong policy drivers for accelerating commercialization of FCEVs and their associated infrastructure.

Source: https://ww2.arb.ca.gov/our-work/programs/hydrogen-fuelinginfrastructure/about

#### China's Fuel Cell Technology Roadmap

In December 2016, China's "13th Five-Year Plan" included a Fuel Cell Technology Roadmap, which laid out targets for fuel cell and hydrogen energy development. The Roadmap calls for over 1,000 hydrogen refueling stations to be in operation by 2030, with at least 50% of all hydrogen production coming from renewable resources. In addition, the Roadmap set a target for over 1 million FCEVs in service by 2030.

Source: <u>http://www.fchea.org/in-transition/2019/2/4/chinese-fuel-cell-industry-</u> <u>developments</u>

#### UK's ITM Birmingham Bus Project

The 3MW project is currently being deployed and combines grid balancing with bus refuelling services. Power grid services include Frequency Control by Demand Management (FCDM) combined with renewable energy contracts as well as trials for Enhanced Frequency Response (EFR). Mobility services target refueling of all types of hydrogen vehicles, from passenger cars to commercial vehicles, including buses, trucks, trains and ships.

Source: ITM Power – Power-to-Gas Energy Storage: Principles, projects and future projects

UK's Big Hit

The EU-funded project aims to demonstrate the use of hydrogen as a flexible local energy store and vector, transporting hydrogen by tube trailer to the mainland near the Scottish island of Orkney. The project aims to produce hydrogen from stranded renewables, with services including 1.5MW of off-grid energy storage, repowering, renewable heat and fuel for transport.

Source: ITM Power – Power-to-Gas Energy Storage: Principles, projects and future projects

## PART 2 – BRUCE INNOVATES

### **Project overview**

A significant opportunity exists for the Bruce region to produce clean hydrogen from off-peak nuclear and renewable electricity, and in doing so, position the region to not only contribute to, but also to benefit from, the transition to a low-carbon economy. To take advantage of this opportunity, Bruce County and Saugeen First Nation have launched a project called "Bruce Innovates: Foundational Hydrogen Infrastructure". The project aims to transform the Bruce region into the clean energy capital of Canada, by establishing a world-class centre for collaboration and training in clean technology development and energy innovation.

At the core of Bruce Innovates is the concept for a world-class centre for collaboration and training in clean technology and energy innovation. The centre will be the hub from which the Bruce region will:

- 1. Developing, testing and scale-up of hydrogen production and storage systems;
- Diversifying and boosting the economy through investments in hydrogen and clean energy innovation;
- Supporting First Nation communities in building capacity towards greater energy selfsufficiency; and
- 4. Accelerate the commercial deployment of Canadian-based hydrogen technologies.

These actions will help unlock the potential for a hydrogen economy in the Bruce region. Some of the major benefits that will come out of it include:

**Placing Ontario at the forefront of a new industrial revolution:** With the versatility of hydrogen, Bruce County has the potential to ignite a new industrial revolution that will enhance the economy, create jobs, move the Province of Ontario into a leadership role in clean tech and put Canada back on the forefront in fighting climate change.

Access to zero emissions energy: Hydrogen is the most promising zero-emissions fuel for the future – it is a sustainable alternative to traditional fossil fuels. It has the potential for mitigating climate change and creating an abundant fuel supply for tomorrow. Hydrogen technology is proven, and the time is right to harness clean electricity to produce this transformative fuel.

**Utilization of off-peak energy:** Hydrogen is the link between a mismatched electricity supply and demand (peak vs. off peak) that forces nuclear and renewable electricity suppliers to curtail (maneuver) operations causing off-peak – in other words, wasted energy. This is known as the off-peak manoeuvring conundrum, and the Bruce transmission zone is struggling to cope with it. A dynamic electrolyser will make productive use of this off-peak clean electricity resource and generate clean hydrogen while automatically following the ebbs and flows of electricity production, thereby utilizing excess energy that would otherwise be curtailed. When demand for electricity is low (off-peak), hydrogen is produced through electrolysis and then stored above ground for immediate use or underground for future use.

### Key partners and stakeholders

In 2018, the County of Bruce Planning and Development Committee began collaboration with the Hydrogen Business Council of Canada (HBC), the Canadian Nuclear Laboratories (CNL), the Organization of Canadian Nuclear Industries (OCNI), and local hydrogen industry stakeholders, including SFN and Carlsun Energy Solutions (Carlsun), to discuss energy innovation in the region. The collaboration began with a paper entitled "Energy Innovation in the County of Bruce", illustrating how Bruce County is uniquely positioned to become the "clean energy capital of Canada". This collaborative effort has formed the basis of what is now known as the Bruce Innovates initiative to advance clean hydrogen technologies in the region.

Two years prior to this, in 2016, an important partnership between Carlsun (a licensed manufacturer and system integrator of advanced hydrogen electrolyser systems) and SFN was formed to initiate steps to advance the concept for a sustainable energy centre and hydrogen technologies in the region. SFN leadership believes hydrogen energy systems using clean electricity offer a sustainable pathway which is fully aligned with environmental protection and sustainability values of First Nations. Initiatives under this partnership use the brand name 7GFUEL® representing the seven generation principles of First Nations, which are Respect, Love, Truth, Bravery, Wisdom, Generosity and Humility.

## **Policy drivers**

Bruce Innovates is in line with the Pan-Canadian Framework for Clean Growth and Climate Change, which is Canada's plan to meet its emission reduction targets, grow the economy, and build resilience to a changing climate. In fact, the scope of Bruce Innovates covers four of the seven types of projects that comprise Canada's climate plan, including:

- Clean and renewable energy;
- Alternative fuel infrastructure;
- Investments in Indigenous, rural and remote communities to transition to cleaner energy sources; and
- Made-in-Canada clean technologies.

While there is no specific hydrogen policy for Canada yet, there is an excellent opportunity for Bruce Innovates to become the catalyst for the development of a national hydrogen policy that will support Canada's fight against climate change.

### **Key objectives of Bruce Innovates**

In partnership with local industry, First Nations and academic institutions, the project will establish a world-class, multi-purpose centre for collaboration and training in clean technology and energy innovation. This work will lay the foundation for the region's plans to build an energy supercluster and eventually become Canada's leader in clean energy innovation. The four key objectives supporting this goal are outlined in further detail below.



## Developing, testing and scaling-up of hydrogen production and storage systems

The Bruce region will be the site for the design, manufacturing and implementation of hydrogen technologies, starting initially with a small-scale demonstration of hydrogen production and storage capabilities (see below for further details). The results of the pilot project will then be used to inform plans for much larger utility-scale hydrogen systems.



#### Hydrogen production and storage demonstration project

The first pilot project within Bruce Innovates will be a Power-to-Gas demonstration of hydrogen production (electrolysis) and energy storage capabilities.

#### Electrolysis demonstration

The current standard in Ontario's power sector is to maneuver (turn down) nuclear and renewable energy production when demand is low. This is wasteful and inefficient. The demonstration will aim to show how an electrolyser utilizes clean electricity and converts it into ultra-pure hydrogen while also providing ancillary services to stabilize the grid.

#### Energy storage demonstration

The aim of this demonstration is to prove that depleted natural gas wells in Bruce region can store large amounts of hydrogen gas to enable seasonal storage for off-peak and curtailed electricity. Demonstrating underground storage in these formations is an essential step to making hydrogen a scalable solution.



## Diversifying and boosting the economy through investments in hydrogen and clean energy innovation

Bruce Innovates will attract investment, create jobs, provide training for the local community, and increase revenue generation for industry participants.

Investment – The need for capital inflow to help develop Bruce Innovates and the hydrogen projects is likely to be met with strong investor interest from around the globe. Investors are actively seeking out assets that can combine clean energy attributes with multiple end-use functionality, as is the case with hydrogen systems.

Training for the local community – Bruce County and SFN will partner with an established educational institution that will directly contribute to the training and development of skills for building a hydrogen economy. Among other objectives, training will aim to equip SFN and people from other First Nations communities with the skills required to be able to operate and maintain hydrogen systems themselves and thereby support efforts in those communities to develop greater energy self-sufficiency.

Jobs – These hydrogen projects will create next-generation career opportunities in clean energy innovation and will attract highly qualified workers and professionals to the Bruce region. Also, construction and assembly will create multiple temporary construction and assembly jobs.

Increased revenue generation – For industry participants and experts in the Bruce region, such as Bruce Power, Carlsun and others, the aim is to provide increased revenue generation by:

- Enabling multiple patent and licensing opportunities;
- Advancing hydrogen technology development;
- Unlocking performance and supply chain cost reduction;
- Accelerating commercialization of hydrogen infrastructure systems and fuels to support rapid implementation of hydrogen technologies required this decade; and
- Reinforcing growth and transition of local small enterprises to become medium sized enterprises.

## Supporting First Nation communities in building capacity toward energy self-sufficiency.

The renewable infrastructure components of Bruce Innovates compliments SFN's desire to become energy self-sufficient and enables the simulation of both microgrid applications and remote/off-grid renewable hydrogen applications.

The energy future of First Nation communities poses a unique set of challenges and opportunities. The challenges lie in adopting cost-effective energy systems that will provide reliable energy services, while at the same time:

- moving communities away from carbon energy sources; and
- building an energy infrastructure that is scalable and will allow communities to prosper.

The opportunities lie in developing a solution which uses resources in the community and can demonstrate First Nation leadership on sustainable energy advancement both now and in the future.

The Bruce Innovates project will bring together solution providers and the resources of First Nations to develop the hydrogen systems that can address the challenges and opportunities mentioned above. The sequence of events is broadly envisioned to be as follows:

- Initially the focus will be to develop renewable-hydrogen systems for back-up power for rural grid-connected communities. These systems will be assembled and factory tested locally.
- Over time these systems can be expanded to provide energy autonomy in remote, offgrid communities currently relying on diesel. Development, testing and assembly of these hydrogen solutions for these remote communities is a primary goal of Bruce Innovates. In time, these micro-grid systems will enable the communities to build community strength through energy independence. Meanwhile, the revenue generated by the provision of these solutions will be a significant boost to SFN.

Additionally, these hydrogen projects will also serve to improve First Nation community engagement. The current practice for new technology development doesn't involve First Nation communities to the extent it ought to. This project would set a precedent in First Nations engagement as it would be the first of its kind to focus on clean-tech advancement to support the development of local, clean energy infrastructure in these communities.

## Accelerating in the commercial deployment of Canadian-based hydrogen technologies

From the late 2020s onward, the plan for Bruce Innovates includes exporting technology advancements and expertise from the Bruce region to the rest of Canada as well as abroad. This will enable the County and its partners to fully capitalize on the commercial opportunities available with hydrogen and clean energy innovation.

The integrated hydrogen systems being considered by Bruce Innovates have high potential for replicability, meaning that there will be a strong commercial export opportunity to other communities across Canada and regions around the globe that wish to develop hydrogen infrastructure on their own. There will also be opportunities to provide subject matter expertise as consultants on other hydrogen projects around the globe.

Commercial export of both hydrogen systems and subject matter expertise could include a mix of the following components and/or services:

- Electrolysers for hydrogen production
- Hydrogen storage technologies
- Grid-connected hydrogen-based system components
- Off-grid / micro-grid system components
- Hydrogen fuels and systems for heat and/or mobility
- Hydrogen products for industry (i.e. green ammonia) and consumer goods



## Action plan and timeline for Bruce Innovates

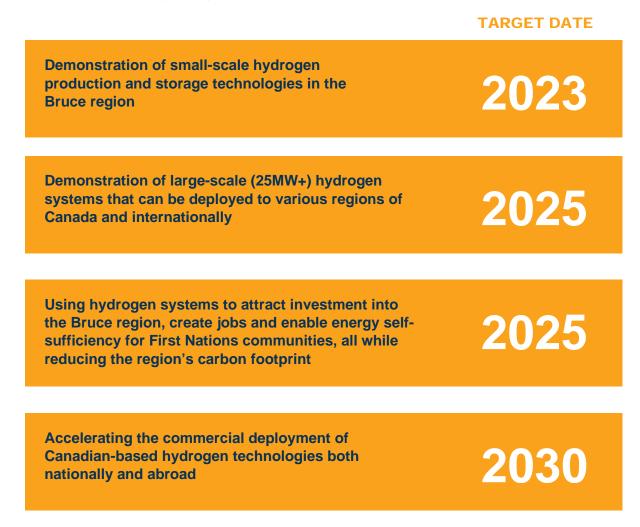
The action plan for the development and execution of Bruce Innovates begins with two preproject phases followed by three project phases, combining for a total duration of 10+ years.

	Pre-project phases		Project phases		
	FEASIBILITY STUDY	BUSINESS PLAN	DISCOVERY	MARKET ENTRY	FULL SCALE DEPLOYMENT
PURPOSE	Answer the question "will Bruce Innovates work?"	Answer the question "how will it work?"	<ul> <li>(i) Establish the energy centre</li> <li>(ii) Prepare and launch hydrogen demonstration projects from the centre</li> </ul>	<ul> <li>(i) Develop larger-scale hydrogen production and storage</li> <li>(ii) Bring facilities online and commercialize the clean hydrogen</li> </ul>	Export technology advancements from Bruce Innovates to other provinces in Canada and abroad
ACTIVITIES	<ul> <li>Assess fundamental economic and technical aspects to the initiative, including but not limited to:         <ul> <li>Objectives and rationale</li> <li>Risks and opportunities</li> <li>Project benefits</li> <li>Innovative solutions considered</li> <li>Engineering requirements</li> <li>Commercial options</li> <li>Financial options</li> <li>Program management and delivery</li> </ul> </li> </ul>	<ul> <li>Establish the business priorities, operating and delivery models, and tactics and strategies that will be implemented to meet business goals of the initiative</li> <li>Define in detail:         <ul> <li>Products/services</li> <li>Organizational structure and governance model</li> <li>Human resources strategy</li> <li>Competitive landscape</li> <li>Marketing and sales strategy</li> <li>Financing strategy</li> <li>Draw from lessons learned from other hydrogen projects across Canada and globally</li> </ul> </li> </ul>	<ul> <li>Design and construct the centre from which project activities, training and R&amp;D will be coordinated and overseen</li> <li>Develop and test small-scale pilot projects for the production and storage of hydrogen gas</li> <li>Develop partnerships with energy and technology companies</li> <li>Plan and do detailed design of the next phase, and include lessons learned from the pilot projects</li> </ul>	<ul> <li>Incorporate lessons learned from the pilot projects in the design and development of larger-scale hydrogen production and energy storage</li> <li>Secure access to resources (i.e. water, power, etc.) required for commercial scale operation of hydrogen facilities</li> <li>Establish contracts with customers for the sale of clean hydrogen</li> <li>Bring facilities online and sell to market</li> <li>Plan and do detailed design of the next phase</li> </ul>	<ul> <li>Identify, target and pursue other jurisdictions/countries where hydrogen solutions developed by Bruce Innovates could be deployed</li> <li>Develop national and global partnerships with industry participants and government agencies to support in the adoption and acceleration of hydrogen-based systems</li> <li>Promote Bruce County as a global leader in sustainable energy innovation</li> </ul>
Year	2020	2020-2021	2021-2023	2023-2025	2025-2030+

## PART 3 – THE OUTCOMES

### Successful outcomes

The expected successful outcomes from the collaboration of Bruce County, SFN, local stakeholders and corporate partners include:



These outcomes will provide the foundation for Bruce County, SFN and stakeholders to become leaders in the integration of large-scale hydrogen industries.

### Lessons learned from other hydrogen projects

As illustrated in the 'Action plan and timeline', one of the key activities that forms part of the Business Plan pre-project phase is 'Drawing from lessons learned from other hydrogen projects in Canada and globally'. There are two main reasons why this will be an important step to perform:

- 1. To gain a more comprehensive understanding of the types of challenges associated with hydrogen projects and the potential impact they could have on project fundamentals; and
- 2. To determine 'what worked well' on other projects that enabled them to finish on time, within budget, and most importantly, how successful outcomes were achieved.

#### **Program management**

Bruce County and SFN, along with other partners, will work together to advance Bruce Innovates, including project initiatives and the demonstration of hydrogen production and storage systems. Bruce County will be the Project Lead for Financial Management and work in partnership with SFN to oversee Project Management.

A Memorandum of Understanding (MOU) has been struck between Bruce County and SFN to advance the following pertaining to Bruce Innovates:

Project area	Approach		
Project oversight	<ul> <li>The Steering Committee will be composed initially of the following members:</li> <li>Chief of Saugeen First Nation</li> <li>Warden of Bruce County</li> <li>Industry Experts</li> <li>Chief Administrative Officer, Bruce County</li> <li>Director of Planning and Development, Bruce County</li> <li>Legal Representative</li> <li>The Steering Committee will meet at least once a month, and additional meetings of the Steering Committee may be held as required.</li> </ul>		
Project development	Agreed that once raised, the Project Funding will be used to advance the Project over the next one to three years, and specifically, within such a timeframe, to advance the following: Power-to-Gas pilot demonstration (production and storage) Design and construction of the centre		
Project resourcing	<ul> <li>Agreed that each Party will provide initial Seed Funding to cover initial Project costs related to the development of: <ul> <li>Feasibility studies and business case development; and</li> <li>Retaining a Project Manager to directly support the management and advancement of the Project, including identifying investors to help secure the Project Funding.</li> </ul> </li> <li>Bruce County shall be responsible for coordinating the Seed Funding.</li> </ul>		

### **Project team**

The Project Team will consist of the following key roles:

Role	Professional qualifications and experiences
Economic Development Manager Planning and Development Bruce County	Project Coordinator – key contact for application / implementation and general coordination of project deliverables
Director Planning and Development Bruce County	Project Lead – liaise with Steering Committee, other levels of government and contacts where appropriate to advance the project
Warden of Bruce County Warden	Steering Committee Member – Municipal Warden / political lead Bruce County
Saugeen First Nation Chief	Steering Committee Member – First Nation Chief / political lead Indigenous Community
Legal Representative	Steering Committee Member / Legal Counsel and Project Management over acquiring commercial investment in overall project vision
Industry Expert	Steering Committee Member Private Sector / Technical Expert Lead

### Join us!

Bruce Innovates invites partners to join us on our mission to become a global leader in clean energy innovation. There's never been a more exciting time to collaborate with us. Your support will be a catalyst as we advance towards our vision of transforming the Bruce region into the clean energy leader of Canada and a global hub for sustainable energy advancement.

