



NORTHLIGHT

POWERING CANADA'S NEXT FRONTIER

Geographic Targeting & Land Strategy

A GEOLOGICAL FRAMEWORK FOR IDENTIFYING,
EVALUATING AND PRIORITIZING NATURAL
HYDROGEN EXPLORATION OPPORTUNITIES
ACROSS CANADA.

NATURAL HYDROGEN
EXPLORATION AND INFRASTRUCTURE

SEPTEMBER 2026

PRIVATE AND CONFIDENTIAL

A different kind of energy.

A different kind of opportunity.

Natural hydrogen does not come from ancient life, the way oil and coal do. It comes from **rock meeting water, in the dark, over spans of time** that make “ancient” feel like an understatement.

Understanding that process — what produces it, where, and how much it can plausibly generate — is the **foundation of everything that follows** in this document.

NorthLight's location strategy begins with a geological premise: **Precambrian continental crust**, rock older than roughly 540 million years and in places several billion, **contains the ingredients to generate hydrogen at meaningful scale**. Canada sits on an extraordinary amount of it. **The Canadian Shield is one of the largest expanses of exposed Precambrian rock anywhere on the planet**, and where it isn't exposed at surface, that same ancient basement continues underground, buried beneath younger sedimentary basins across much of the country.

Two mechanisms operating within that rock do the actual work of generating the gas: **iron-driven water-rock reactions**, chief among them **serpentinization**, and **radiolysis**. Together they **form the scientific foundation** for everything NorthLight screens for, geographically — and this document exists to trace that foundation carefully, from the physics of hydrogen generation through to specific townships and greenstone belts where NorthLight is putting capital.

The temptation in this industry, visible constantly in competitor messaging, is to treat **“the right kind of rock is present” as interchangeable with “there is a hydrogen deposit here.”** **It is not.**

Generation is only the first link in a chain that also requires migration, a trap, and preservation over time. The significance of the Precambrian Shield is not that it points to a resource. It is that it defines a **search domain large enough, and geologically credible enough**, to be worth narrowing systematically — from mechanism, to measurement, to structural analogy, to the individual land positions where NorthLight is actually looking.

The evidentiary standard that follows is grounded in four clearly identified sources of evidence and interpretation.



To Barbara Sherwood Lollar and colleagues' 2014 *Nature* paper, *The contribution of the Precambrian continental lithosphere to global H₂ production*.



To the Royal Society's June 2025 policy briefing, *Natural hydrogen: future energy and resources*, which Sherwood Lollar chaired.



To specific pieces of public research conducted for this strategy.



Or is marked plainly as NorthLight's own strategic interpretation rather than an established finding.



How Hydrogen Actually Forms

TWO NATURAL MECHANISMS. IMMENSE TIME. THE FOUNDATION OF NORTHLIGHT'S THESIS.



1. SERPENTINIZATION: IRON MEETS WATER

When water reaches iron-bearing minerals—principally olivine and pyroxene—in mafic and ultramafic rock, iron oxidizes from Fe(II) to Fe(III) and the water is reduced, releasing hydrogen gas. This reaction, serpentinization, is the first of the two mechanisms behind NorthLight's thesis.

- **Not all rock is equally good at it.** Ultramafic rocks, peridotite the classic example, are rich in reactive iron-bearing minerals and are the most productive host rock. Mafic rocks, like basalt, produce an estimated 10–100x less hydrogen per unit volume, but basalt's abundance means it still matters regionally.
- **Temperature matters.** The Royal Society's 2025 review cites a modeled peak yield around 300°C under hot, deep-crust conditions. Newer research shows meaningful production well below 100°C, broadening the range of crustal settings worth considering.
- **Ingredients are not enough.** Finding mafic or ultramafic rock somewhere does not mean hydrogen is accumulating there. Prospectivity depends on reactive iron mineralogy, water access, and a geological setting capable of sustaining interaction over time. The presence of the ingredients establishes that generation is possible, not that hydrogen has built up in any meaningful concentration.



2. RADIOLYSIS: RADIATION SPLITS WATER

Crystalline rock naturally contains trace radioactive elements—uranium, thorium, potassium. As they decay, they release ionizing radiation that splits water in fractures and pore spaces, producing hydrogen as a byproduct. Unlike serpentinization, radiolysis operates in essentially all crystalline rock; yield depends on U, Th, K concentrations, water availability, and time.

- **Time is everything.** Radiolysis is extremely slow on human timescales. Precambrian rock has had billions of years for this process to accumulate hydrogen.
- **The science that reframed the field.** Sherwood Lollar and colleagues' 2014 *Nature* paper rebuilt global production estimates from the ground up.

RADIOLYSIS ALONE

0.16 – 0.47 × 10¹¹ moles H₂ per year

Previous estimate: ~0.009 × 10¹¹ moles H₂ per year

RADIOLYSIS + SERPENTINIZATION

0.36 – 2.27 × 10¹¹ moles H₂ per year

Comparable in magnitude to marine hydrogen production

Global production estimate, not a resource or reserve in any specific location.

A 2026 PNAS paper by Sherwood Lollar and Oliver Warr extends this picture using a decadal record of continental hydrogen reservoirs measured at a Canadian mine.



3. WHY THE CANADIAN SHIELD MATTERS

Put the two mechanisms together and a Canada-Shield-focused strategy becomes scientifically defensible.

- ✓ Extensive mafic and ultramafic rock for serpentinization.
- ✓ Ubiquitous crystalline basement with variable U, Th, K for radiolysis.
- ✓ Fractures and pore spaces that allow groundwater to circulate.
- ✓ Billions of years of geological time for both processes to generate hydrogen.



4. COMPLEMENTARY MECHANISMS

Serpentinization is selective; it requires specific, reactive lithologies. Radiolysis is a generalist, operating across the full catalogue of crystalline rock.

Where favorable lithology, water access, and structural complexity coincide, the geological case strengthens considerably.

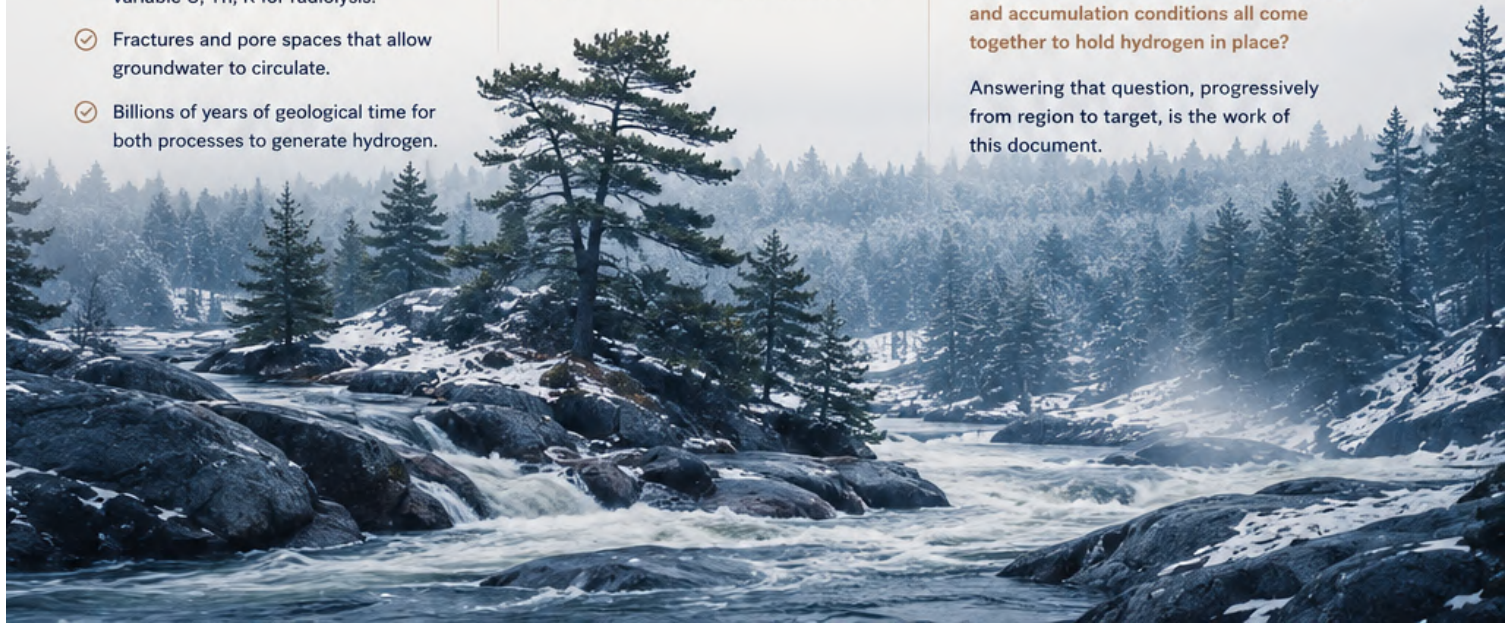


5. THE EXPLORATION QUESTION THAT MATTERS

A setting capable of generating hydrogen may still lack the structures that let it migrate, the reservoir conditions that let it pool, or the seal that preserves it over time.

The real question is narrower — and harder: where do source rocks, generation mechanisms, water-rock interaction, migration pathways, and accumulation conditions all come together to hold hydrogen in place?

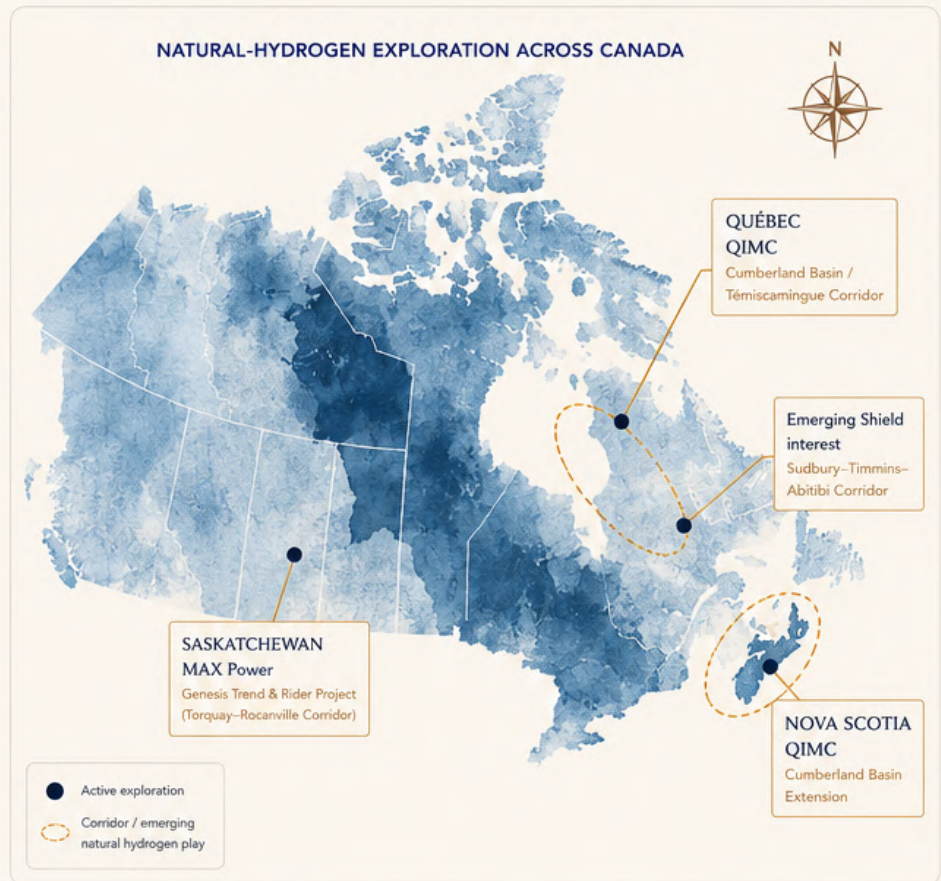
Answering that question, progressively from region to target, is the work of this document.



Where Others Are Drilling

Competitive activity as real-world validation.

NorthLight is not the only company testing this geological framework, and that is useful rather than threatening. Across Canada, natural-hydrogen explorers are pursuing several distinct models: buried Precambrian basement beneath sedimentary basins, exposed Shield and greenstone environments, and rift and fault corridors. Watching where others are staking land, drilling, and reporting results offers a form of real-world validation that does not depend on NorthLight's own capital or timeline: which models are actually being tested, where direct evidence has turned up, whether those settings resemble NorthLight's own targets, and where industry activity strengthens or complicates the thesis developed above.



MAX POWER – THE MANITOBA ANALOGUE

Buried Precambrian basement → structural migration → sedimentary cover



Southern Saskatchewan



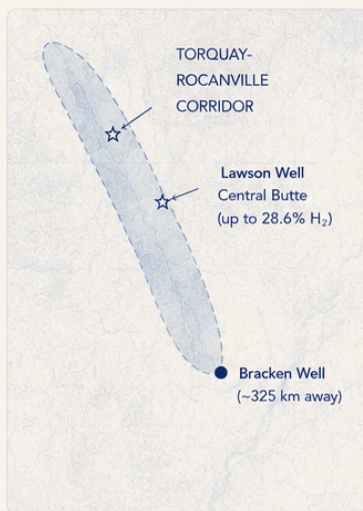
Genesis Trend
~475 km structural corridor



~1.3 million acres
permitted land package



Rider Project
~200 km corridor
Public figures vary:
~1,244 to 3,356 km²



MAX Power is the single most directly relevant competitor analogue to NorthLight's Manitoba model. Its primary position is in southern Saskatchewan, the Genesis Trend, a roughly 475-kilometre structural corridor with an approximately 1.3-million-acre permitted land package, plus the Rider Project within the roughly 200-kilometre Torquay-Rocanville Corridor. Public figures for the Rider position vary meaningfully across the company's own releases, reported anywhere from roughly 1,244 to 3,356 square kilometres, a discrepancy worth noting rather than smoothing into a single number. MAX Power's stated thesis mirrors the structural logic behind NorthLight's own Manitoba position: southern Saskatchewan sits atop the Western Canadian Sedimentary Basin, beneath which lies crystalline Precambrian basement faults as the potential migration pathway into the sedimentary cover above.

In January 2026, MAX Power announced what it described as Canada's first subsurface natural-hydrogen discovery at its Lawson well near Central Butte, hydrogen concentrations up to 28.6 percent, reported as free-flowing to surface. By mid-2026 the company had drilled a second well, Bracken, roughly 325 kilometres away, reporting multiple hydrogen and helium targets, and was using 3D seismic to delineate a structure it calls Lawson Central, at roughly 14.2 square kilometres within a broader prospective area.

None of this transfers directly to Manitoba, but it demonstrates that the buried-basement model is not theoretical: an explorer using basement composition, deep fault architecture, and sedimentary cover has produced reported hydrogen at a real Canadian subsurface location. The strength of the Manitoba thesis will depend less on the fact that Precambrian basement exists beneath the package, which is close to certain, and more on whether the relevant lithologies and structural pathways can actually be demonstrated at package scale.



QIMC – THE MINING-CORRIDOR TEST

Shield discovery → proprietary rift-graben model → rift-basin fault play



Quebec – Témiscamingue / Abitibi



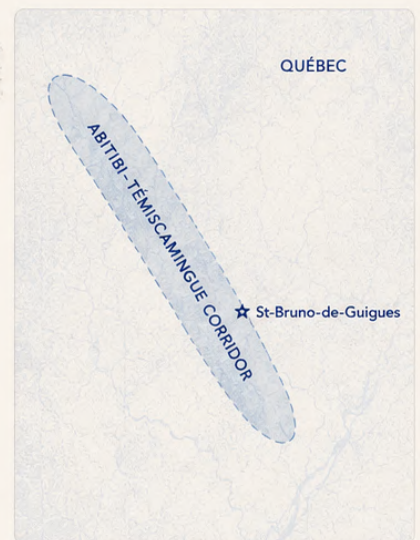
St-Bruno-de-Guigues /
Original and strongest-
performing discovery
area



R2G2™ Model /
Reactivated Rift and
Graben Geosstructure,
developed with Prof.
Marc Richer-Lafleche
(INRS)



C\$17.25M /
Bought-deal financing
closed April 2026 to
advance drilling and
subsurface modeling



QIMC is a particularly useful comparator because it is testing two structurally distinct plays at once. Its principal position is the Témiscamingue region, centred on the St-Bruno-de-Guigues property, which the company describes as its original and strongest-performing discovery area — the basis for its proprietary R2G2™ targeting model, developed with Prof. Marc Richer-Lafleche of INRS. This is directly relevant: the broader Abitibi-Témiscamingue corridor is explicitly identified in the Royal Society's 2025 briefing as a Canadian example of hydrogen-favourable geology co-located with historic mining activity, making QIMC's Quebec program the strongest direct geographic overlap between an actively drilling competitor and a corridor named in that framework.

In August 2026, QIMC reported hydrogen concentrations up to 23.5% within the first 300 metres of drilling at its Bennett Hill project, part of the company's Advocate Area in Nova Scotia — a structurally distinct rift-basin, fault-controlled play tied to the Cobequid-Chedabucto Fault Zone, closer to MAX Power's Saskatchewan migration logic than to QIMC's own Quebec Shield position. That result followed an even higher reading of 24.3% at 707 metre depth in an earlier hole roughly 15 kilometres away and QIMC has since drilled six metres its Nova Scotia program to a roughly 43-kilometre corridor, describing the pattern as evidence of a district-scale rather than point-source hydrogen system.

None of this transfers directly to NorthLight's own targets, but it demonstrates that both of NorthLight's core geological models are being actively tested elsewhere in Canada. QIMC closed a C\$17.25 million bought-deal financing in April 2026 to advance drilling and subsurface modeling, and no independently published, peer-reviewed papers presenting the R2G2™ model itself has been identified — it should be treated as approach, Shield mining-corridor logic in Quebec paired with rift-basin logic in Nova Scotia, reinforces that natural hydrogen is not a single geological play, and provides the closest current industry test of the Shield mining-corridor relationship central to NorthLight's own thesis.



NORTHLIGHT POWER

The search has narrowed. It has a geography.

*The research has narrowed where
the uncertainty is worth resolving.*



NUNAVUT

MULTIPLE DEFINED EXPLORATION PATHWAYS

- Meliadine and Three Bluffs are the leading first-look targets.
- Five additional greenstone/mineral-district candidates.
- A documented kimberlite pathway worth testing.
- A distinct buried-basin play type in the Arctic Archipelago.



SOUTHWESTERN MANITOBA

A DEFINED LAND POSITION

- Buried Precambrian basement.
- Defined land application.
- Regional structural relationship that existing geophysics can test directly.



THE EXTERNAL VALIDATION

COMPETITION CONFIRMS THE PATH

Competitor activity shows that multiple versions of these geological models are already being pursued independently across North America.

Precambrian crust is not, by itself, a targeting model.



Natural hydrogen generation is established within Precambrian continental crust. But measured concentrations vary substantially from place to place.

*Crustal age alone cannot tell NorthLight where
a commercial system exists.*

WHY MINING DISTRICTS MATTER

They concentrate geology, structural complexity, extensive subsurface information and energy demand in the same place.



LITHOLOGY

Favorable
source rocks.



STRUCTURE

Migration and
trapping architecture.



LEGACY DATA

Existing subsurface
information.



ENERGY DEMAND

A reason to
develop locally.



A deeper look at Nunavut sharpened the targets — and expanded *the playbook.*



Two original targets hold up — for stronger, more precise reasons. They complement rather than duplicate each other.

MELIADINE

The infrastructure case.

Producing mine since 2019
~1,600 employees
All-weather road to Rankin Inlet
Existing infrastructure and community proximity



COMMITTEE BAY / THREE BLUFFS

The geology case.

~2.73 Ga mafic-ultramafic volcanic sequence
Iron formation bearing
Documented deformation and shear zone architecture



MELIADINE
RANKIN INLET BELT

COMMITTEE BAY
THREE BLUFFS
COMMITTEE BAY BELT

RANKIN INLET •

They complement rather than duplicate.

Committee Bay presents the stronger independently documented bedrock case.

Meliadine presents the stronger access and infrastructure case.

THE EVIDENCE BASE HAS MOVED FORWARD

New multi-year measurements from Kidd Creek provide direct evidence of sustained hydrogen discharge from Canadian Shield rock.

Research commentary accompanying the study specifically identified Nunavut and the Northwest Territories as regions sharing relevant geological settings.

Regional implication; not a direct hydrogen measurement from Nunavut.



STRONGER GEOLOGY

Committee Bay's bedrock sequence is well-constrained and peer-reviewed.



STRONGER ACCESS

Meliadine's operating mine and road access create a clear infrastructure advantage.



COMPLEMENTARY FIT

Different strengths.
Different risks.
Stronger together.



READY TO TEST

No direct H₂ / He evidence at either site — making them ideal first-look targets.

Nunavut is not a two-target story.

The deeper screen surfaced multiple geological pathways.

Our research revealed more than additional locations — it revealed different play types operating across the territory.

Shield, kimberlite and buried basin systems each offer distinct exploration opportunities.



01

GREENSTONE / SHIELD

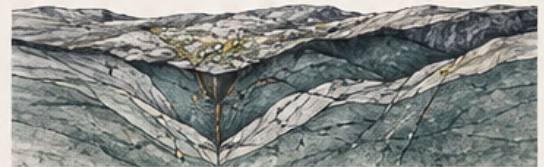
Exposed Canadian Shield systems.



- Meliadine
- Committee Bay / Three Bluffs
- Hope Bay
- Mary River (Baffin Island)
- Roche Bay
- Woodburn Lake
- Yathkyed Greenstone Belt*

*Early reference only — follow-up required.

SHIELD / GREENSTONE SYSTEM



Iron-rich volcanic rocks, ultramafic bodies and structural pathways at or near surface.

02

KIMBERLITE PATHWAY

A different generation mechanism.

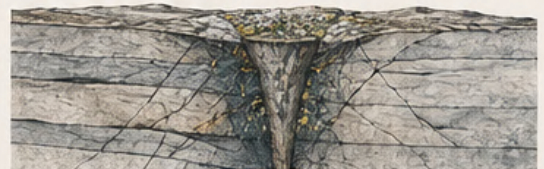


- Churchill Kimberlite Field
- Chidliak Kimberlite Field

Low-temperature kimberlite-groundwater interaction has been shown to generate hydrogen near Kirkland Lake, Ontario.

A documented kimberlite field lies between Rankin Inlet and Chesterfield Inlet, close to Meliadine.

KIMBERLITE SYSTEM



Kimberlite intrusions with deep fluid circulation can generate hydrogen through rock-water interaction at low temperatures.

03

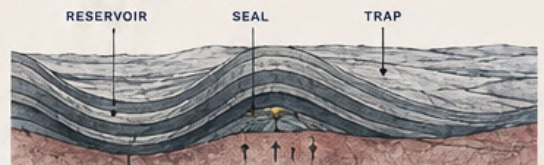
BURIED BASIN SYSTEMS

Petroleum-style architecture.



- Bathurst Island / Lancaster Sound
- Sverdrup Basin (Ellesmere & Axel Heiberg Islands)

BURIED BASIN MODEL



Reservoir-seal-trap architecture overlying basement sources at depth.

“One territory. Multiple play types.

Exposed Shield targets, a potential kimberlite pathway, and petroleum-style buried basin architecture all exist within Nunavut.



MULTIPLE PLAY TYPES
Different geological models increase probability of discovery.



NEW MECHANISMS
Kimberlite interaction adds a distinct, validated generation pathway.



STRUCTURAL DIVERSITY
From exposed Shield to buried basins — multiple exploration models.



GEOGRAPHIC SPREAD
Targets span the Kivalliq mainland and Arctic Archipelago.



OPTIONALITY
A broader funnel creates more paths to a hydrogen discovery.

The Manitoba Land Position

From geological thesis to a defined 668,160-acre application position.

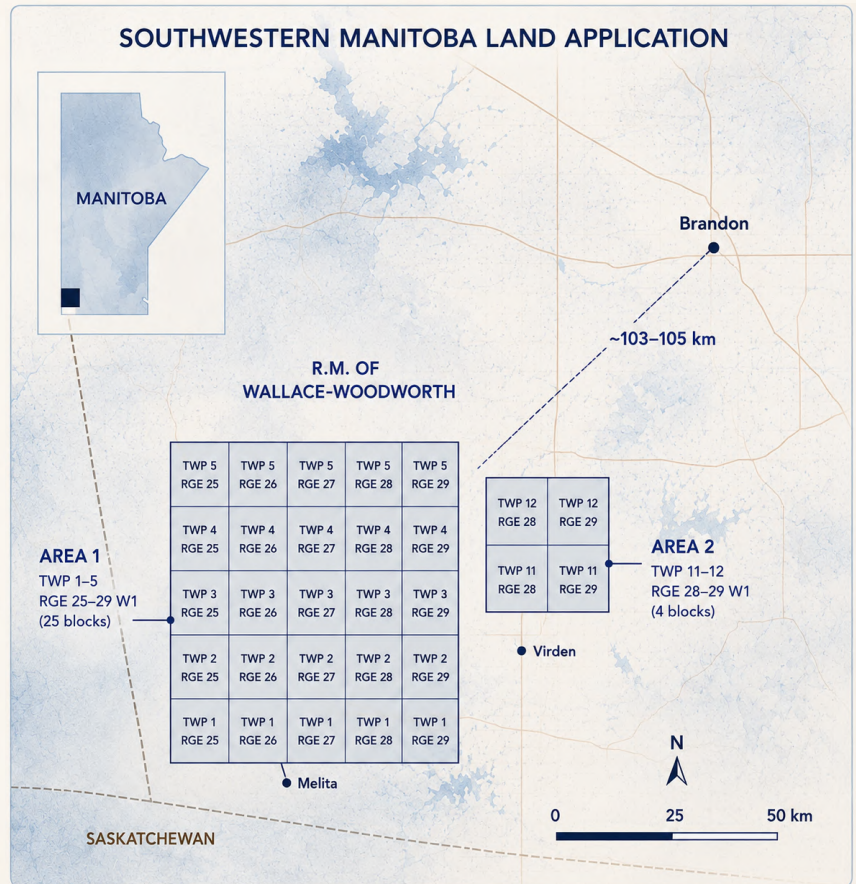
NorthLight's first defined land position sits in southwestern Manitoba, where Critical Discoveries, led by Aaryn Hutchins, P.Geo., submitted an application dated August 8, 2026, for a hydrogen exploration agreement under Section 67 of Manitoba's The Oil and Gas Act. The application converts the geological thesis developed above into an actual, legally defined land position, and it represents a genuinely different geological play type from the exposed-Shield environments the Nunavut discussion has focused on. There is no surface exposure of greenstone or ultramafic rock here. The play depends instead on Precambrian basement buried beneath the Williston Basin, with hydrogen generated at depth potentially migrating upward through structural pathways into the sedimentary cover above it.

The application requests a Section 67 exploration agreement over two target areas in southwestern Manitoba. Area 1 covers Townships 1–5, Ranges 25–29 W1 of the First Principal Meridian (25 nominal township blocks). Area 2 covers Townships 11–12, Ranges 28–29 W1 (4 nominal township blocks). Together, the application totals approximately 668,160 gross acres (before any deductions for excluded Crown or private land, road allowances, or irregular sections). That figure was independently pre-derived rather than taken on faith from the cover letter, and it checks out. The application's stated rationale is Precambrian basement beneath the Williston Basin, major basement structures and faults, groundwater circulation, and multiple deliberately non-invasive: interpretation of regional aeromagnetic and gravity data, detailed review of historical petroleum wells and available basement intersections, remote-sensing analysis, soil-gas surveys, and review of groundwater and geochemical data, all feeding into a prospectivity model before any drilling is considered.

The requested townships sit in the extreme southwestern corner of Manitoba, in the Rural Municipality of Wallace-Woodworth. Area 1 (Townships 1–5, Ranges 25–29 W1) lies around Melita and the Elkhorn–Kirkella area, roughly 103 to 105 kilometres west of Brandon, near the Saskatchewan border. Area 2 (Townships 11–12, Ranges 28–29 W1) lies around Virden and Wallace-Woodworth. This is firmly southwestern Manitoba, not the exposed Shield terrain of the province's north, and not the same geological neighborhood as Thompson. The only Manitoba location with a reported Tier 1 hydrogen measurement in Sherwood Lollar's dataset, Township 12, Range 28, was independently corroborated as sitting within Wallace-Woodworth using a legal-description address, SW–22-12-28, listed in the municipality's own business directory, an external check that goes beyond simply accepting the application's own description of where it sits.

An earlier internal description of this package cited a well as "TORC South Kirkella at 12-24-011-29W1"; that specific citation could not be confirmed in Manitoba government well-activity records. The broader claim it was trying to support holds up: the package sits within an area of documented historical petroleum drilling, confirmed through two separate wells in Manitoba's Weekly Well Activity Reports, the Tundra et al South Kirkella HZNTL 15-9-11-29 (UWI 100.15-09-011-29W1.00, reported 2013) and the T. Bird et al South Kirkella 12-9-11-29 (UWI 100.12-09-011-29W1.00, reported 2007–2008 and listed as capable of oil production), both of which establish that Township 11, Range 29 has a documented petroleum drilling history under the South Kirkella field name. Historical well data will always have gaps and inconsistencies in government databases; that is precisely why NorthLight's work relies on multiple independent data types and careful structural and stratigraphic interpretation rather than any single source in isolation.

The township block schedule attached to the version of the application reviewed here was badly garbled, rows out of order, township and section numbers interleaved, legal descriptions broken across lines. The township-range-section-quarter combinations were extracted programmatically and checked against the full survey grid. Area 1 (Townships 1–5, Ranges 25–29) is fully recoverable; all possible quarter-sections are present. Area 2 (Townships 11–12, Ranges 28–29) is also fully recoverable; all possible quarter-sections are present. In total, the application requests 29 nominal township blocks across two target areas.



668,160

GROSS ACRES REQUESTED

Twenty-nine nominal township blocks = ~1,044 square miles = ~668,160 gross acres (before any exclusions)

HISTORICAL PETROLEUM WELLS – SOUTHWESTERN MANITOBA



Tundra et al Melita HZNTL 15-9-11-29
(UWI 100.15-09-011-29W1.00)
Reported 2013



T. Bird et al Melita 12-9-11-29
(UWI 100.12-09-011-29W1.00)
Reported 2007–2008
Listed as capable of oil production



DILIGENCE NOTE — APPLICATION AREA SCHEDULE



AREA 1
TWP 1–5,
RGE 25–29 W1

25
NOMINAL
TOWNSHIP BLOCKS



AREA 2
TWP 11–12,
RGE 28–29 W1

4
NOMINAL
TOWNSHIP BLOCKS

The application requests approximately 668,160 gross acres across 29 nominal township blocks in two southwestern Manitoba target areas.

Gross acreage is stated before exclusions and remains subject to final reconciliation against the Province's applicable land and tenure records.

Why Southwestern Manitoba

A buried-basement play defined by structure, migration and what still needs to be proven.

The Manitoba application targets a setting structurally distinct from every Tier 1 location in the 2014 dataset. The closest Manitoba measurement, Thompson, sits in the Thompson Nickel Belt within the Superior Boundary Zone, on exposed Archean Shield terrain in the province's north. NorthLight's application instead covers two target areas in southwestern Manitoba: Area 1, Townships 1–5, Ranges 25–29 W1, and Area 2, Townships 11–12, Ranges 28–29 W1. Together, the 29 nominal township blocks represent approximately 668,160 gross acres before exclusions. Here, Precambrian basement is buried beneath the sedimentary succession of the Williston Basin, creating a fundamentally different geological setting from Thompson. The Manitoba thesis is not that the two settings resemble one another at surface; it is that buried Precambrian basement, deep structures and associated migration pathways may create the elements of a natural-hydrogen system beneath southwestern Manitoba.

This is where Manitoba Geological Survey work becomes genuinely relevant. MGS research documents helium and geologic-hydrogen occurrences in southwestern Manitoba and finds that many occur near deep basement structures. It also identifies Precambrian domain boundaries and the Superior Boundary Zone as being associated regionally with structural and stratigraphic irregularities in the overlying sedimentary succession — features that can provide potential migration pathways and trapping mechanisms. Importantly, the 2026 work identifies areas of highest helium and geologic-hydrogen potential around Townships 1–5, Ranges 26–29 W1, and Townships 11–12, Ranges 28–29 W1. Those areas substantially align with NorthLight's two application areas. That is meaningful geological support for the targeting thesis; it is not evidence that hydrogen has been discovered within NorthLight's acreage.

The expanded position therefore creates two defined areas in which the buried-basement thesis can be tested. Area 1 encompasses the broader southern target around Melita, while Area 2 encompasses the Virden / Wallace-Woodworth target. MGS work provides evidence that the relevant regional ingredients exist in southwestern Manitoba: Precambrian source rocks capable of hydrogen generation, deep basement structures, faults and stratigraphic irregularities that may facilitate migration, and sedimentary units capable of acting as reservoirs or traps. Separate MGS work has also documented elevated hydrogen measurements in Williston Basin wells, including wells in Townships 11–12, Ranges 28–29 W1. The source and significance of those measurements remain uncertain, which is precisely why the next step is systematic exploration rather than a discovery claim.

The diligence standard remains deliberately conservative. A larger application position is not, by itself, evidence of a better resource. The geological thesis should continue to be tested against primary-source mapping, historical petroleum wells, aeromagnetic and gravity data, basement structure, groundwater and geochemical evidence, and ultimately field measurements. Regional structural relationships should not be presented as confirmed township-level geology until NorthLight's own interpretation and field work establish them. The application defines where NorthLight intends to explore; it does not establish that commercial hydrogen is present.

What the Manitoba position represents today is a defined exploration application built around a testable geological thesis — not a discovery. NorthLight has submitted a Section 67 application covering two southwestern Manitoba target areas totaling 29 nominal township blocks and approximately 668,160 gross acres before exclusions. The position is supported by a plausible buried-basement model and, importantly, by independent Manitoba Geological Survey research identifying essentially the same two southwestern Manitoba corridors as areas of elevated helium and geologic-hydrogen potential. The work ahead is to determine whether the required source, structure, migration, reservoir and trapping elements actually coincide within NorthLight's application areas at a scale capable of supporting a viable hydrogen system.



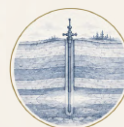
DIFFERENT SETTING THAN THOMPSON

Thompson, the only Manitoba Tier 1 hydrogen measurement, sits in the Thompson Nickel Belt on exposed Shield. NorthLight's application is in the far southwest, where Precambrian basement is buried beneath the Williston Basin.



A REGIONAL STRUCTURAL CONNECTION

The Superior Boundary Zone extends southward beneath southwestern Manitoba. If this zone, or a related structure, underlies the requested townships, it could provide the deep structural corridor and pathways for hydrogen migration from basement to basin.



WHAT IS KNOWN VS. WHAT IS NOT

There is a documented regional continuation of the zone. There is not yet confirmation that it passes directly beneath NorthLight's specific four-township area. Geophysical interpretation will test for that township-level overlap.



COMPETITOR LANDSCAPE

No companies in the reviewed set disclose a position in southwestern Manitoba. Kavenex identifies basins as prospective settings, so the area cannot be ruled out as a potential future area of interest.



DILIGENCE STANDARD FOR FUTURE PACKAGES

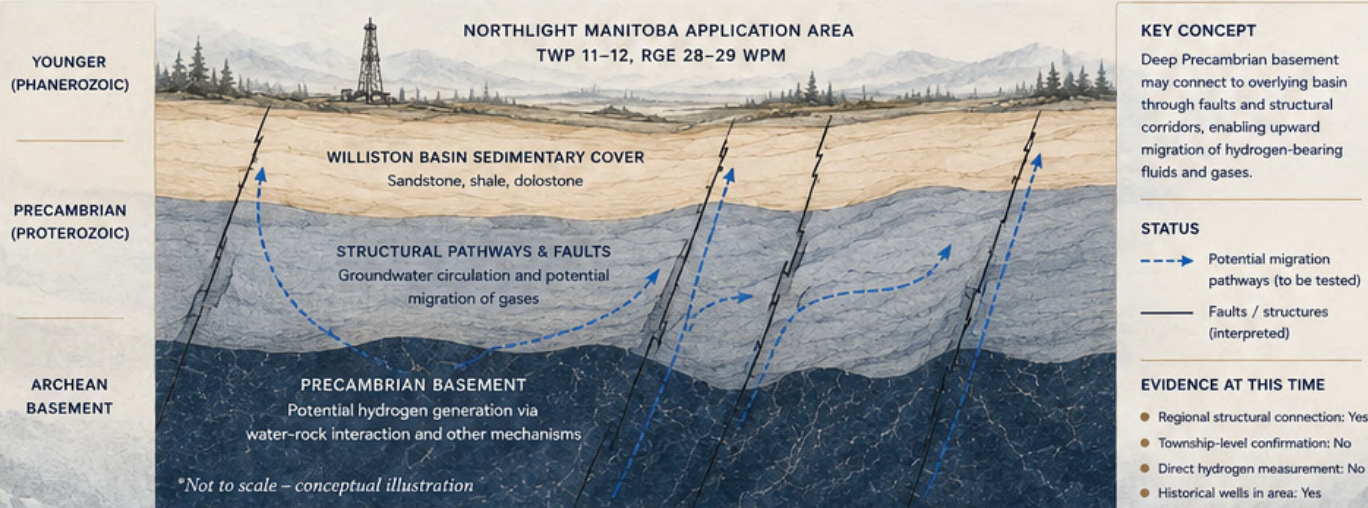
Independently verify geography, wells and permits, acreage, geological rationale, and competitor overlap—stating clearly the limits of what was checked.



WHAT THIS POSITION REPRESENTS TODAY

A defined land application with a plausible exploration model, meaningful subsurface data, and a regional structural question worth testing—not yet a hydrogen occurrence and requiring further work to validate.

CONCEPTUAL MODEL – BURIED-BASEMENT HYDROGEN PLAY IN SOUTHWESTERN MANITOBA



What NorthLight Can Act On Now

From geological plausibility to direct, location-specific evidence.



FOCUSING EFFORT WHERE
THE NEXT EVIDENCE CAN
CHANGE THE ANSWER.



Nunavut has moved from a territorial thesis to a genuine geological shortlist.

The screen now distinguishes multiple ways a natural-hydrogen system could work: first-look greenstone targets at Meliadine and Committee Bay / Three Bluffs, additional Shield candidates, a kimberlite pathway, and buried-basin systems in the High Arctic. Kidd Creek provides independent evidence that sustained hydrogen discharge can occur from Canadian Shield rock. None establishes hydrogen in Nunavut; together, they define which geological mechanisms warrant testing and where the next evidence should be sought.



Manitoba now has a defined geological question rather than an open-ended thesis.

NorthLight's Section 67 application covers 29 nominal township blocks across two southwestern Manitoba target areas, totaling approximately 668,160 gross acres before exclusions. Manitoba Geological Survey research independently identifies substantially the same two corridors as areas of elevated helium and geologic-hydrogen potential. The question is no longer simply where to look, but whether source, structure, migration and trapping conditions actually coincide within the application areas.



Competitor activity independently tests several pieces of the underlying targeting logic.

MAX Power, HyTerra, QIMC and Koloma are pursuing different geological settings and exploration approaches, including buried basement, legacy wells, structural corridors and frontier plays. None validates NorthLight's specific targets, and their geology is not interchangeable with NorthLight's. Together, however, they demonstrate that several components of the exploration models NorthLight is evaluating are being tested independently across an emerging natural-hydrogen sector.



Advance from geological plausibility to direct, location-specific evidence.

In Nunavut, review legacy data and samples, interrogate helium and noble-gas datasets, compare priority belts and then sample directly. In southwestern Manitoba, integrate basement structure, historical wells, aeromagnetic and gravity data, groundwater and geochemical evidence before progressing to field testing and drill targeting. The objective is the same in both jurisdictions: resolve the largest uncertainties with the lowest-cost, highest-information work before committing capital to more expensive exploration.

IMMEDIATE PRIORITIES



NUNAVUT

Immediate Priorities

Historical borehole and gas-analysis review at strongest candidates

Identify archived samples or accessible boreholes

Search for helium and noble-gas datasets

Belt-scale structural and lithological comparison across candidates

Direct sampling once groundwork is complete



SOUTHWESTERN MANITOBA

Immediate Priorities

Obtain basement-structure data

Resolve Superior Boundary Zone relationship at the township level

Integrate aeromagnetic and gravity interpretation

Review historical petroleum wells before drill targeting



NORTHLIGHT POWER

From geological plausibility to location-specific evidence.

*The next phase is not broader screening.
It is targeted resolution.*

NorthLight now has specific geological questions to answer in two jurisdictions — and a clear sequence for answering them before committing significant exploration capital.



NUNAVUT

INTERROGATE WHAT IS ALREADY THERE.

The immediate opportunity is to determine whether decades of mining and mineral exploration have already captured a hydrogen signal that was never being looked for.



LEGACY BOREHOLES

Review historical borehole records and gas analyses at the strongest candidates.



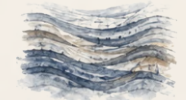
ARCHIVED MATERIAL

Identify preserved core, fluid samples and accessible exploration boreholes.



H₂ + NOBLE GASES

Search existing hydrogen, helium and noble-gas datasets before initiating new fieldwork.



COMPARE THE BELTS

Resolve lithological and structural differences across Meliadine, Committee Bay and the newly identified candidates.



SAMPLE DIRECTLY

Use the legacy-data screen to determine where direct gas/fluid sampling has the highest information value.



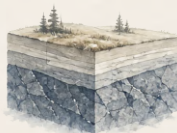
The question in Nunavut is no longer “where might we look?”
It is “where can existing information get us closest to a measurement?”



SOUTHWESTERN MANITOBA

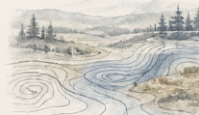
RESOLVE THE STRUCTURE BEFORE DRILLING IT.

The land position now presents a specific question: what is the relationship between NorthLight's townships, the buried Precambrian basement and the Superior Boundary Zone?



BASEMENT STRUCTURE

Obtain and integrate available basement-structure information.



AEROMAGNETICS + GRAVITY

Use existing geophysics to refine structural interpretation at township scale.



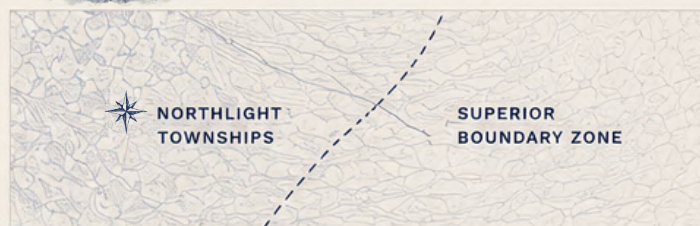
HISTORICAL WELLS

Review petroleum wells for basement depth, gas shows, fluid chemistry and other useful legacy observations.



TARGETING DECISION

Determine whether the structural relationship warrants progressively more expensive exploration.



THE SECTOR IS TESTING THE COMPONENTS

MAXPOWER

Buried basement + structural migration

HYTERRA

Historical hydrogen-bearing wells revisited with modern tools

QIMC

Active drilling within a scientifically identified corridor

KOLOMA

Capital deployed across both frontier geology and confirmed-occurrence targeting

*These programs do not validate NorthLight's targets.
They demonstrate that the component exploration models are being independently tested across the emerging natural-hydrogen sector.*

In both jurisdictions, the objective is the same:
advance from geological plausibility
to *direct, location-specific evidence* —

using existing information to reduce uncertainty
before progressively more expensive
exploration begins.



Local Use vs. Export



NORTHLIGHT POWER

A hydrogen discovery is not revenue. Turning one into revenue means moving the gas — or a converted carrier like ammonia — from the wellhead to a buyer, and that step follows entirely different economics depending on where the discovery sits.



Two paths,
*genuinely distinct rather
than variations on one problem:*

- * **Local use** — hydrogen consumed at or very near the wellhead, displacing diesel in a generator, a fuel cell, or mobile equipment within a few kilometres of where it came out of the ground.
- * **Export** — hydrogen, or hydrogen converted into a carrier like ammonia, moved to a buyer elsewhere: a nearby industrial customer, a port, or an international market.



FOR EVERY NORTHLIGHT LOCATION
CURRENTLY IDENTIFIED,

local use is very likely
*the only economically defensible
near-term path —*

not because export is impossible in principle, but because hydrogen's transport economics, combined with the real logistics of each target region, make export a

long-term proposition
rather than a near-term one.

That conclusion runs against some of the political rhetoric currently circulating around Hudson Bay energy corridors,

AND IT IS ARGUED
*from cost data
and primary
sources, not
asserted.*

EVIDENTIARY STANDARD

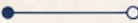
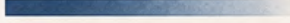
Every cost figure that follows is sourced and dated. General literature ranges are identified as such rather than presented as Canada- or NorthLight-specific. Where NorthLight's own geography changes the applicability of a general finding, that is stated directly.



The Physics Problem, and What It Costs to Solve

Hydrogen carries roughly three times the usable energy per kilogram of gasoline — but at atmospheric pressure, that kilogram occupies about eleven cubic metres. Every transport method is a different strategy for solving that volume problem, and none is free: compression to 700 bar requires 1.35–3.0 kWh/kg; liquefaction to -253°C requires 10–13 kWh/kg — a penalty paid before the hydrogen moves at all; and conversion to ammonia and back runs below 25% round-trip efficiency, though it remains the preferred industry choice because ammonia infrastructure already exists at scale.



MODE	COST	DISTANCE BASIS	BEST SUITED TO
 Pipeline, repurposed	<\$0.50/kg 	6,000 km 	Mature, high-volume, long-term flow
 Pipeline, new build	\$0.50–3/kg 	up to 7,000 km 	>1,500 t/day; long payback justified
 Truck, compressed (CGH ₂)	Highly distance-sensitive 	Economical to ~200–300 km 	Short-haul, flexible delivery
 Truck, liquid (LH ₂)	Higher capex, lower per-trip cost 	Medium distance 	Medium-haul, no pipeline present
 Rail	\$4–6/kg 	1,000 km 	Bulk inland, H ₂ -specific rail exists
 Ammonia, shipped	\$2.50–4.50/kg 	10,000 km 	Long-distance / maritime export
 LOHC, shipped	\$1.48–1.86/kg 	7,000–20,000 km 	Long-distance export, conventional tankers
 Liquid hydrogen, shipped	~1.5–2× ammonia cost 	Long-distance 	Only where no pipeline exists



Literature figures; production cost of the hydrogen itself excluded from all.

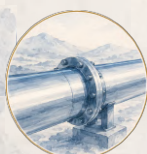
IEA comparative figure for all shipped-carrier pathways by 2030: \$16–31/GJ, vs. LNG at ~\$3–7/GJ.

The Pipeline Catch

These figures assume the pipeline already exists, or that building one is justified by large, sustained flow. Pipelines are fixed-infrastructure, high-capital, long-payback — they suit a mature basin moving contracted volumes with no confirmed buyer.

Hydrogen Embrittlement — a Second Pipeline Constraint

Injecting hydrogen into steel pipeline measurably degrades fracture toughness and fatigue resistance. ASME B31.12 applies added requirements above 10% H₂ by volume, but recent testing shows degradation can occur below that threshold — no injection level is currently considered intrinsically risk-free. California's PUC (2022) found blends above 5% could require downstream appliance modification. A 2026 Canada-specific feasibility study flags cold-climate embrittlement behavior as a stated, unresolved research gap — directly relevant to any future Manitoba or Arctic pipeline scenario, where operating temperatures are colder than almost anywhere this literature has been tested.



Manitoba: The Best-Connected Target, and the *Churchill Finding*

Of every NorthLight location, southwestern Manitoba offers by far the strongest existing infrastructure. NorthLight's two application areas span the Melita / Elkhorn–Kirkella and Virden / Wallace–Woodworth corridors, placing the broader land position near established road and rail networks, natural-gas infrastructure, treated-water access and regional aviation. The precise infrastructure advantage varies across the 29 nominal township blocks, but the overall starting position is materially different from any Nunavut target: this is an exploration thesis embedded within an established southern Canadian transportation and service network.



CANADIAN PACIFIC
BROADVIEW
SUBDIVISION



TRANS-CANADA
HIGHWAY



NATURAL GAS
SERVICE



TREATED WATER



VIRDEN
AERODROME

Local Use

Attractive if a commercial discovery is established. The two application areas sit within an established southwestern Manitoba road and service network, creating multiple potential pathways to nearby industrial or commercial users. Any delivered-cost advantage would ultimately depend on where hydrogen is discovered, production scale, conditioning requirements and distance to the eventual customer. At this stage, infrastructure is an advantage to test — not yet a demonstrated project economy.

Export — the Port of Churchill Finding

Churchill creates a potential long-term export pathway if southwestern Manitoba ultimately supports commercial hydrogen production. Manitoba has identified Churchill as a strategic northern trade and energy corridor, with established rail access to a deepwater Hudson Bay port and growing investment in northern infrastructure. For NorthLight, that creates future optionality: hydrogen produced in southern Manitoba could potentially be converted into a transportable carrier such as ammonia and moved north by rail for export.

Churchill is proven for bulk mineral cargo — 10,000 tonnes of zinc concentrate moved rail-to-port in August 2024 — but that does not extend to hydrogen on current evidence. Rail export via ammonia conversion is technically plausible, but would require conversion capacity at or near the production site and confirmed commercial flow rates. It should therefore be treated as a potential long-horizon pathway, not an assumed component of the Manitoba business case.

The Honest Manitoba Conclusion

Local use remains the more credible near-term commercialization pathway if NorthLight ultimately confirms a producible hydrogen system within either southwestern Manitoba application area. The existing transportation and service network creates optionality that NorthLight's northern targets do not have. Export through the Port of Churchill should remain a longer-horizon possibility tied to the broader Churchill corridor and confirmed project economics, rather than a near-term monetization assumption.



Nunavut: A Genuinely Different Logistics Problem

Road, rail, and multi-modal infrastructure at Manitoba's level are entirely absent at both Nunavut first-look targets — a difference in kind, not degree.

Meliadine connects to Rankin Inlet by a 30-km all-weather road built and maintained by Agnico Eagle for the mine; it extends nowhere beyond that footprint. Three Bluffs has no comparable infrastructure on record. Beyond that road, Kivalliq's only outward connections are seasonal sealift (late June–October) and year-round air cargo. There is no rail service anywhere in Nunavut.



Sealift cost anchor: as of April 2026, Nunavut Eastern Arctic Shipping set Churchill–Kivalliq rates at \$485.45 per revenue tonne — a 46% jump over the prior year. Shipping from Bécancour, Quebec (roughly ten times farther) now costs the same as via Churchill — a pricing anomaly Kivalliq business leaders have publicly criticized.

Sealift rates here do not behave as a function of distance, and cost modeling should not assume they will.

Dangerous-goods handling (a category compressed gas falls under) adds further packaging, documentation, and cost on top of this base rate, and requires planning a full shipping season in advance.



Air cargo is available year-round but is by far the most expensive option in the region — one estimate: \$9,000–\$15,000 to fly a single passenger vehicle into Nunavut. Not a realistic channel for bulk volumes; an emergency or small-shipment option only.



Local Use — Strong, With a Direct Scientific Anchor

Meliadine already runs a 31.3 MW, six-unit diesel plant; Kivalliq-wide diesel consumption runs ~138 million litres annually (2.1 million GJ at Meliadine alone in 2024).

The May 2026 Sherwood Lollar/Warr PNAS paper states this almost as if written for NorthLight: co-author Oliver Warr notes that co-locating mining demand with hydrogen production and use reduces the need for long transport routes, storage, and major infrastructure — and lead author Sherwood Lollar names Nunavut and the NWT specifically as regions where hydrogen concentrations appear to coincide with existing mining activity. (Researcher commentary, not a Nunavut-specific measurement or a Meliadine reference by name — but a directly citable data point from the same primary source anchoring this entire strategy.)



Export

Given the sealift cost anchor, one shipping window per year, and dangerous-goods handling premiums, any hydrogen-as-ammonia export from Kivalliq would need to clear a considerably higher cost bar than Manitoba before competing with established ammonia routes elsewhere.

Not impossible at very large scale — but materially weaker than Manitoba's case, and much weaker than local use.



Scale anchor (Kidd Creek, Timmins — not Nunavut, not directly transferable): individual boreholes averaged ~8 kg H₂/yr each; aggregate output across ~15,000 boreholes exceeded 140 tonnes/yr, equivalent to ~4.7 million kWh/yr — enough for 400+ homes. A real order-of-magnitude anchor for what one well-characterized system can plausibly deliver.

The diesel problem is large. And concentrated.

Some of the largest documented off-grid diesel loads across Canada's North.

Operational annual consumption only.
Not all figures are directly comparable.

OPERATIONAL ANNUAL DIESEL CONSUMPTION

≈158_{ML}

Agnico Eagle
Nunavut Operations



Converted from reported energy consumption.

≈138_{ML}

Kivalliq Region
(Communities + Mining)



Regional estimate for five communities plus mining

≈55_{ML}

QEC — Nunavut
Community Electricity



Territory-wide diesel use for off-grid communities.

≈54_{ML}

Meliadine Mine



Converted from reported energy consumption.

≈45_{ML}

Northwest Territories
Community Diesel



2023/24 exceptional year (hydro drought & outage).

≈60_{ML}

Raglan Mine



Off-grid nickel mine in Nunavik, Québec.

LOGISTICS / DELIVERY VOLUMES — NOT COMPARABLE TO ANNUAL BURN

Baffinland Iron Mines

≈40_{ML}

Sealift / ice road fuel delivered (multi-year reserves & construction included).



B2Gold Goose Project

≈80–85_{ML}

Fuel delivered (multi-year reserves & construction included).
Operational burn at steady state not yet published.



NORTHLIGHT
Diesel dependence is measurable.
So is the opportunity to displace it.

~292

REMOTE CANADIAN
COMMUNITIES

ALMOST EXCLUSIVELY
DIESEL-DEPENDENT
(~185,000 PEOPLE)

75+

REMOTE NORTHERN
COMMUNITIES

ACROSS THE
TERRITORIES

682_{ML}

OF DIESEL CONSUMED
ANNUALLY

~\$1.5B ESTIMATED
ANNUAL SPEND

6–10×

THE CANADIAN
AVERAGE FOR ENERGY

~\$0.13/kWh IN SOME
COMMUNITIES

\$300–400M

PER YEAR IN GOVERNMENT
SUBSIDIES JUST TO KEEP
THIS RUNNING

NUNAVUT

40,000 RESIDENTS /
25 COMMUNITIES

100% DIESEL-DEPENDENT
~2/3 OF GENERATORS
AT OR BEYOND MECHANICAL
END-OF-LIFE



~138M L figure from Nukik Corp. / CanNor reported estimate for the five communities plus mining operations.
Conservative relative to Agnico Eagle's 2024 operational data (~158M L) for Nunavut operations.

Kivalliq: A concentrated diesel demand.

Across five communities and multiple mining operations, the Kivalliq region of Nunavut consumes approximately



138
MILLION LITRES / YEAR
OF DIESEL FUEL

This diesel is essential to power remote communities, run critical infrastructure, and support large-scale industrial activity in one of Canada's most isolated regions.

INDUSTRIAL LOADS ARE THE ANCHOR.

Mining operations drive the majority of diesel consumption, with community electricity and local heating/transportation making up the balance.



~11 MILLION LITRES

Documented annual diesel use for community electricity across the five main Kivalliq communities.



MINING & INDUSTRIAL

Gold mining operations such as Meadowbank/Amaruq and Meliadine drive the majority of regional diesel use.



COMMUNITY ELECTRICITY

Qulliq Energy Corporation (QEC) generators power the five main communities off-grid.



HEATING & TRANSPORTATION

Space heating, municipal services and local transportation consume the remaining volume.



≈138M L figure from Nukik Corp. / CanNor reported estimate for the five communities plus mining operations. Conservative relative to Agnico Eagle's 2024 operational data (~158M L) for Nunavut operations.