

Tidal Energy Progress Report

Progress since the Final Report of the Task Force on Sustainable Tidal Energy Development in the Bay of Fundy
October 2026

Tidal Energy
Progress Report

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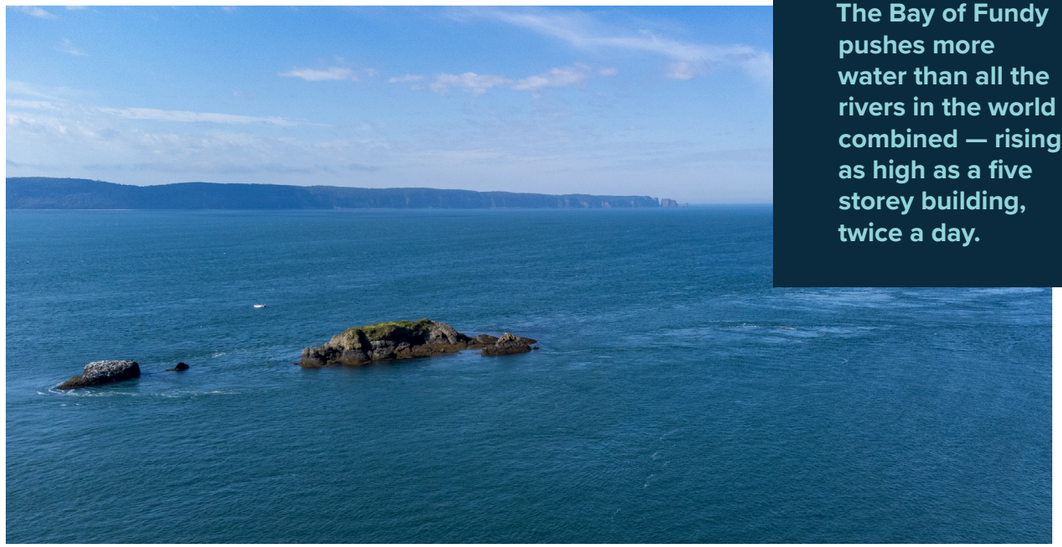
Future State For Tidal Energy

The Task Force on Sustainable Tidal Energy Development in the Bay of Fundy delivered its final report in February 2024. Membership included Fisheries and Oceans Canada and Natural Resources Canada (co-chairs), Nova Scotia's Department of Environment and Climate Change and Department of Natural Resources and Renewables, Marine Renewables Canada, and FORCE.

Cover image: Orbital Marine Power's 2-megawatt O2 turbine

SECTION ONE

History of Development



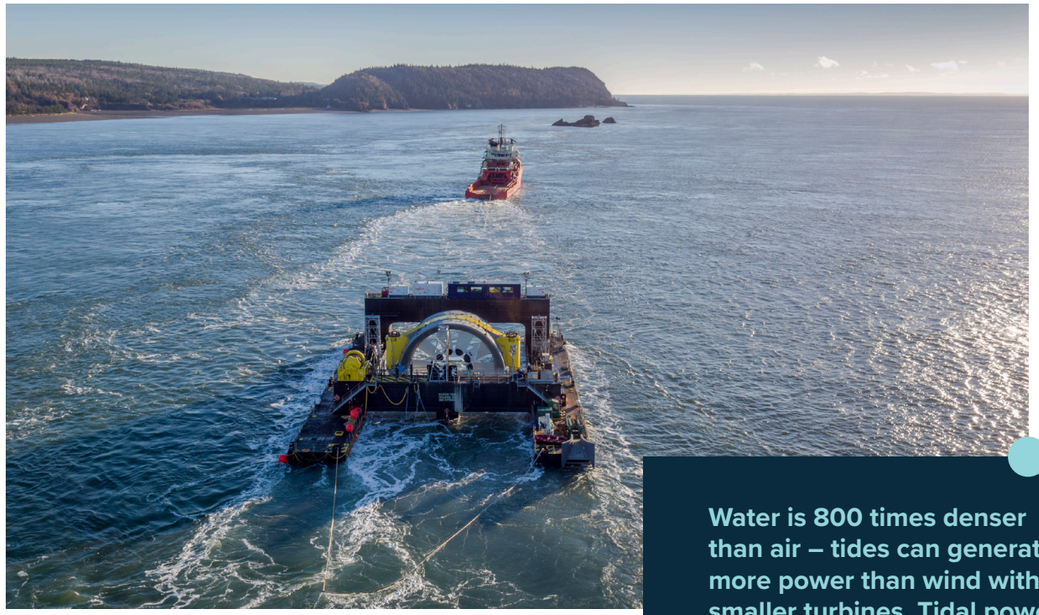
The Bay of Fundy pushes more water than all the rivers in the world combined — rising as high as a five storey building, twice a day.

As tides pinch through the Minas Passage, currents reach speeds of over 5 meters per second

I. Ancient Power

For millions of years, the Bay of Fundy has been a place of power:

- **Volcanic:** As North America and Africa began to break apart, tectonic stretching and volcanic activity created Fundy's enormous basin, its southern ridge forged by massive lava flows
- **Legendary:** Mi'kmaw stories teach that Kluskap created the tides by stirring the waters with his great paddle – a reminder that tidal forces are not just natural phenomena, but part of a living cultural landscape
- **Useful:** Acadian settlers later built tidal mills powered by wooden gates and gravity, a precedent to use the tide respectfully
- **Energy-rich:** North America's first tidal barrage – the Annapolis Royal Tidal Generating Station – demonstrated large-scale energy potential but also the environmental risks with older barrage technology, including fish mortality, that contributed to its closure in 2019



OpenHydro's open-centred turbine was among the early designs to emerge in the 2000s

Water is 800 times denser than air – tides can generate more power than wind with smaller turbines. Tidal power is also predictable, flowing four times each day, forever.

II. Tidal Stream Emerges

A new technology, a lighter footprint:

- **Kinetic:** While dams block the tide, tidal stream devices work with it – passively capturing the kinetic energy of the tide like a windmill underwater
- **Predictable:** Tidal stream devices generate electricity four times a day, during both the ebb and flow tides
- **'Everest' of tides:** The UK was the early leader exploring this new technology, but the Bay of Fundy was known for its staggering energy potential. Research at Acadia University showed that up to 2,500 megawatts might be extracted without significant system effects, more than Nova Scotia's total electricity demand



Electricity generation is still the #1 source of greenhouse gas emissions in Nova Scotia

Almost 90% of Nova Scotia's electricity generation came from fossil fuels until 2007.

III. Getting Off Carbon

To transition Nova Scotia away from its historical reliance on fossil fuels to generate electricity, both provincial and federal governments have advanced aggressive clean energy targets:

- 80% clean electricity by 2030 (Nova Scotia)
- An end to coal use for electricity by 2030 (Nova Scotia)
- Net-zero emissions by 2050 (Canada)
- Canada's Energy Innovation Program has channeled millions into tidal research to meet international climate targets and displace fossil fuels



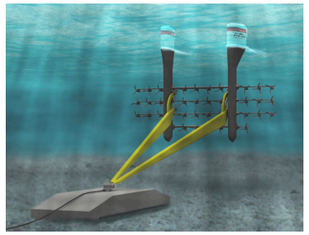
FORCE's visitor centre overlooks the ocean test site in Minas Passage

IV. Creation of FORCE

The Fundy Ocean Research Centre for Energy (FORCE) was created in 2009 as a not-for-profit to advance tidal energy as a shared provincial and national priority. The facility included:

- A "plug-and-play" technology site, allowing developers to connect to the grid
- Environmental monitoring data, shared with the public
- Services and solutions to help projects succeed safely, bringing together industry, government, Rights Holders, academia and other partners







Early technology companies included (clockwise from top left) Clean Current, Marine Current Turbines, Black Rock Tidal Power

V. A Sector Begins

FORCE attracted companies from across Canada and around the world:

- **Early technologies** included Clean Current, Underwater Electric Kite, Alstom, Siemens, Marine Current Turbines, Black Rock, BigMoon and others, realizing various stages of planning, development, and even fabrication
- **Early achievements** deploying devices, connecting to the grid, and generating electricity (OpenHydro, Sustainable Marine Energy)
- **Early lessons** in technology design, project financing, and regulating new technologies in an environment that made it challenging to capture and interpret data

SECTION TWO

Advent of Task Force

I. An Industry Stalls

By 2023, the industry reached a breaking point:

- Developers faced unclear federal triggers; regulators and scientists lack a unified position on risk; investors lost confidence
- Sustainable Marine Energy became Canada's first floating platform to deliver electricity to the grid – but decided to shut down its project
- The sector needed a path forward

"If companies leave Canada for a clearer regulatory process, we lose investment, expertise, and the opportunity to build a domestic sector."

Lindsay Bennett, FORCE

II. Task Force Launched

Natural Resources Canada (NRCan) and Fisheries and Oceans Canada (DFO) create the **Task Force on Sustainable Tidal Energy Development in the Bay of Fundy** (Task Force) to clarify the regulatory path:

- Co-chaired by DFO and NRCan, the Task Force invites provincial representatives, Rights Holders, regulators, scientists, fishers, industry leaders, and FORCE to map the barriers
- The process focuses on aligning provincial licensing regime with federal environmental protections, with an emphasis on a risk-based approach



Sustainable Marine Energy's 420 kilowatt PLAT-I first delivered power in 2022



Field studies conducted in partnership with Fishermen and Scientists Research Society will help determine if commercial lobster catches may be affected by the presence of a future turbine



The Bay of Fundy

III. A New Approach

The Task Force focused the conversation on managing uncertainty. Regulators, scientists, Rights Holders, industry and other partners worked together to refine risk assessment criteria, clarify the regulatory pathway, map monitoring expectations, and establish a process for developing the next generation of monitoring tools and approaches.

Early Success

The Task Force's Final Report (2024) created:

- **A staged approach** allowing developers to deploy a single device before adding more
- **Clear monitoring expectations** for each phase
- **A pathway** for long-term (15-year) authorizations aligned with provincial licensing
- **Support for new research** related to monitoring and collision risk
- **New collaboration** between regulators and the international scientific community

Industry responded, securing the first Fisheries Act authorization under the new Staged Approach the following year. The sector returned to life.

SECTION THREE

Priority Areas for Continued Success

I. Planning for Growth

	Pre (1915-2009)	Early (2009-2023)	Now (2024-2030)	Future (2030+)
Scope	Tidal barrages; massive enclosures	Single devices; unclear expectations	Small arrays; clear regulatory process	Larger arrays; data-driven approvals
Drivers	Simple tech, but high impacts	High cost, many unknowns	Staged growth, financeable	Growing benefits: economy, clean energy



A delegation to observe an operating turbine in Scotland included Mi'kmaw Chiefs and leadership from the Assembly of Nova Scotia Mi'kmaw Chiefs, Confederacy of Mi'kmaw Nations, Atlantic Policy Congress of First Nations Chiefs Secretariat, Orbital Marine Power, and FORCE

II. Indigenous Engagement and Partnership

Mi'kmaw leadership – including the Confederacy of Mi'kmaw Nations and the Assembly of Nova Scotia Mi'kmaw Chiefs – is helping to shape the future of tidal, with the expanding integration of Mi'kmaw knowledge, leadership, values, and practices into marine renewable energy development. Netukulimk (respectful resource use) and Etuaptmumk (Two-Eyed Seeing) will help guide tidal research, planning and development decisions, prioritizing coexistence with fisheries and cultural practices.

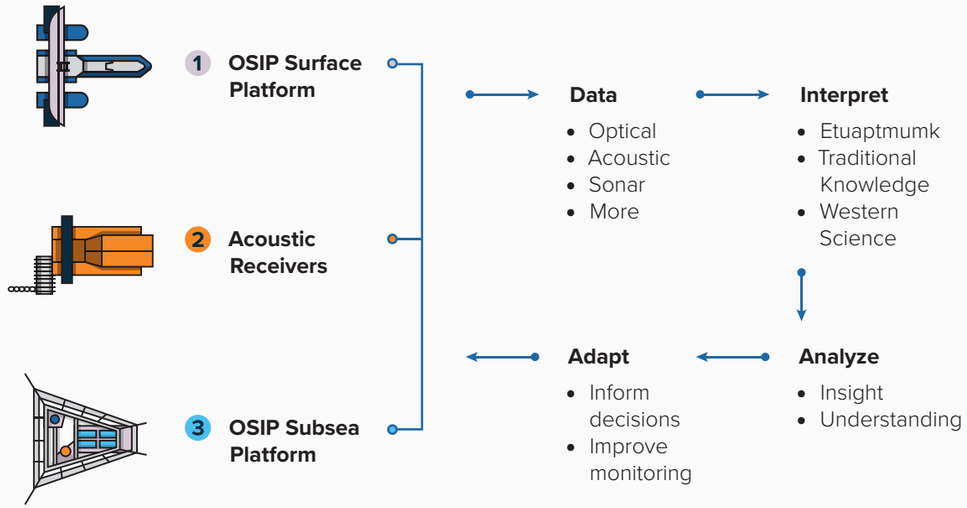
III. Leading-Edge Science

New technology and monitoring approaches – like those advancing with the NRCan-funded Ocean Sensor Innovation Platforms (OSIP) project – provide a stronger understanding of marine life movement in the Bay of Fundy, informing not just Canadian activity but the global sector. This includes:

- Best practices for adaptive environmental effects monitoring
- Integrated optical, acoustic and modelled data
- AI-supported fish tracking, interpretation and analysis
- Collaborative approaches: many partners with different data needs, uses, and outputs

These tools generate evidence to help support regulatory decisions and reduce uncertainty for both investors and people who care about the continued health of the Bay of Fundy ecosystem.

Multiple Tools, One Understanding



IV. Greater Regulatory Clarity

Canada's Staged Approach now supports:

- 15-year conditional authorizations
- Staged deployment
- A route to growth for project developers

This gives the sector predictability – helping to support long-term investment in tidal energy projects, training programs, research efforts, and more.

As the Staged Approach is still new, the federal government will continue to oversee its application to individual projects, ensuring it provides both appropriate environmental protection and the clarity investors need, while refining the approach as experience and evidence develop.

V. Local Economic and Social Impact

The industry has broad economic benefits:

- Over 300 Nova Scotia companies have been involved in the supply chain, from marine welding in Dartmouth to environmental consulting in Wolfville
- The Digby region has developed major tidal competencies and assets of interest to developers and policymakers
- FORCE continues to help drive Marine Renewables Canada's (MRC) 2050 Sector Vision, connecting with organizations like Pacific Northwest National Laboratory (PNNL) and OES-Environmental, PRIMED (University of Victoria), European Marine Energy Centre (EMEC), and more

"By 2050, we see a one-gigawatt industry creating lasting jobs, investment and expertise in coastal communities – and positioning Canada as a global clean energy leader."

Elisa Obermann,
Marine Renewables Canada



Marine operations bring together engineers, fabricators, operators, and skilled personnel



The Scottish delegation included Mi'kmaw Chiefs and leadership from the Assembly of Nova Scotia Mi'kmaw Chiefs, Confederacy of Mi'kmaw Nations, Atlantic Policy Congress of First Nations Chiefs Secretariat, Orbital Marine Power, and FORCE

VI. Learning from Others

In Spring 2025, FORCE led a delegation to the Orkney Islands, Scotland – a global hub for tidal technology – bringing together Mi'kmaw leaders, industry, and community partners to explore lessons for the Bay of Fundy. The visit reinforced a shared commitment to environmental monitoring, compatibility with traditional fishing areas, and early, meaningful community involvement.

Through FORCE, Canada is connecting to a growing international sector:

- EMEC has hosted over 30 marine energy devices and sets global industry standards
- US investment in wave and tidal reached $130M USD in 2024, supporting both project activity around the country and world-leading environmental effects research at the Pacific Northwest National Laboratory
- Over 20 countries are actively developing tidal stream technology, pursuing both environmental safeguards and project activity

Canada can adapt many of these practices to the Bay of Fundy. The reverse is also true: Canada's expertise in relation to its unique tidal resource is exportable; success in the Bay of Fundy offers clear evidence of our world-class ability.

SECTION FOUR

Future State for Tidal Energy

Just 1% of the energy potential in Minas Passage could power over 20,000 homes.

I. Marine Renewables Canada (MRC) Sector Vision 2050

With Canada's electricity demand expected to at least double by 2050, MRC has set a national roadmap for the trajectory of tidal:

- 30 MW of tidal permitted in Nova Scotia by 2030
- 64 MW of tidal generation in operation, planning, or development at FORCE by 2040
- 1 GW of tidal capacity nationally by 2050: a combination of larger arrays and smaller community-based projects

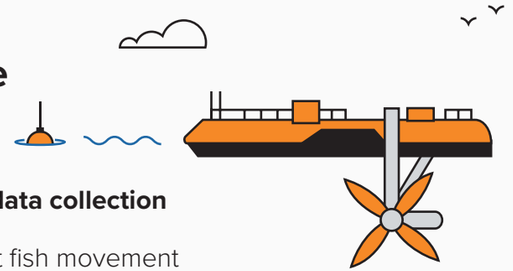
II. Continued Collaboration and Oversight

The sector stretches across the province and beyond:

- Federal and Provincial governments
- Regulators
- Mi'kmaw leadership
- Research institutions
- FORCE
- Industry representatives



Year One: Single Device Operation



Environmental data collection

- Learning about fish movement
- Acoustic monitoring
- Optical/camera monitoring

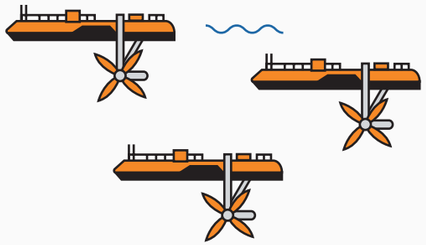
Building Evidence

- Data collection: marine life, environment, sensors
- Interpretation: contextualize and understand patterns
- Analysis: evaluate effects and inform decisions

Additional deployment informed by ongoing monitoring

Adaptive monitoring insights feed back to refine monitoring and inform next steps

Monitoring continues as deployments expand



Orbital's first year of operation with a single device and monitoring lead to additional deployments informed by ongoing environmental data collection, interpretation and analysis



FORCE staff head out for a day of operations in Minas Passage

Tidal energy requires diverse skills; a growing sector will create opportunities in coastal infrastructure, marine operations, ocean tech, science, and more.

III. Upcoming Milestones (2026–2030)

- OSIP deployments begin to validate monitoring solutions and best practices – integrating ocean data with Rights Holder Knowledge, study design, and regulatory checklists
- Orbital submits first operating data to DFO for review, building towards a full year of monitoring data and future expansion towards 16.5 MW of total potential capacity
- FORCE, Acadia University, CMN, Ocean Tracking Network and other partners are developing shared telemetry data in Minas Passage to inform modelling and support a range of ocean research applications

IV. Environmental Leadership

The results of the Task Force have helped clarify the regulatory path to responsible growth: a science-led approach where each megawatt added to the grid is backed by data. DFO's Staged Approach is supported by:

- Evidence
- Transparency
- Indigenous stewardship

V. Canadian Market Growth

International investors and developers are returning to Canada with more confidence: the rules are becoming clearer, the science continues to advance, and electricity demand is expected to at least double by 2050. The Bay of Fundy is positioned as a global hub for activity, science, and investment.

force

Fundy Ocean Research Centre for Energy

+1-902-406-1166
info@fundyforce.ca

1156 West Bay Road
Parrsboro, Nova Scotia

