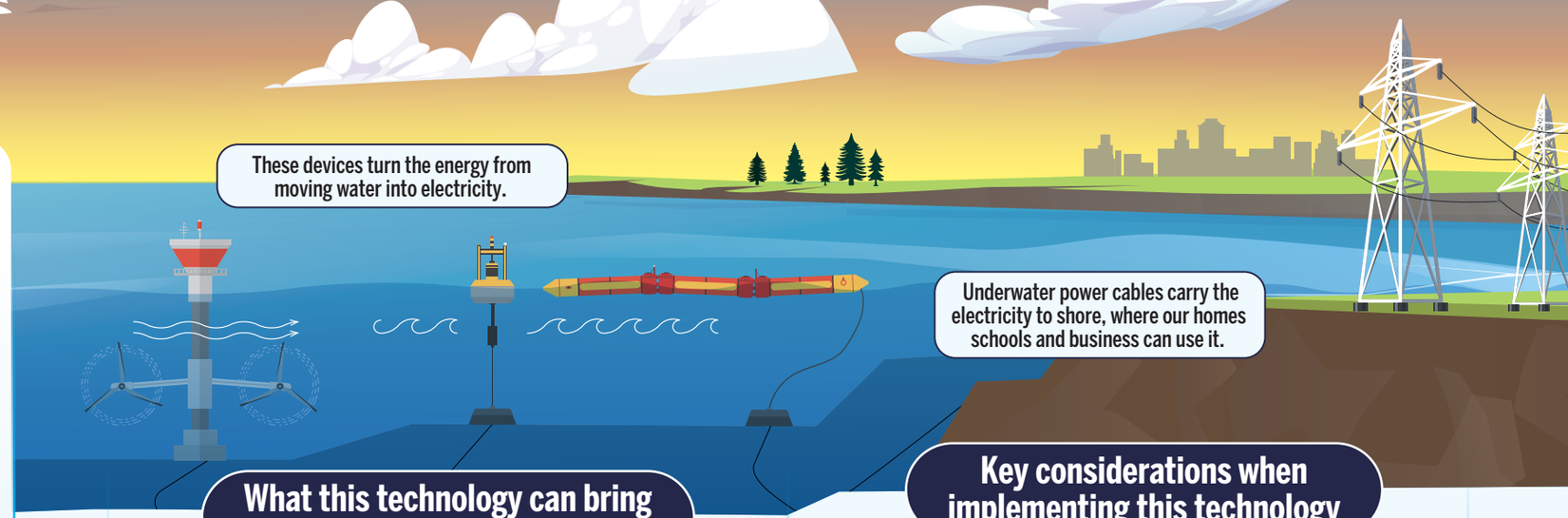
Marine and river hydrokinetic energy

Transforming power in Northern and remote communities

How does marine and river hydrokinetic energy work?

There are three types of marine and river hydrokinetic energy systems:

- **Tidal systems** use underwater turbines anchored to the bottom of the ocean to capture the energy from changing tidal currents. As the tide goes in and out, the turbine blades spin to produce electricity.
- **Wave systems** use devices that float on the surface or are attached to the ocean floor to capture the energy of waves. The motion of the waves moves hydraulic pistons, which turn generators to produce electricity.
- **River hydrokinetic systems** use turbines anchored in rivers or attached to floating structures. The water flows around the turbine blades, making them spin and generate energy.



About 70% of the Earth's surface is covered with water: an abundant source of renewable energy. Marine and river hydrokinetic energy systems take the flow and natural movement of water to generate electricity. Whether they're capturing the energy of tides, waves, or rivers, these systems can bring both financial and environmental benefits to Northern and remote communities across Canada.

Cost of marine and river hydrokinetic energy[1,2]: (tidal) $$$$$

What this technology can bring to your community

- Marine and river hydrokinetic energy generates clean energy without any pollutants or emissions.
- The flow of tides and rivers is very reliable, so the amount of electricity produced by these systems is very predictable.
- Even if the tops of rivers and oceans are frozen over, there are still currents under the ice that can be tapped into – making marine and river hydrokinetic energy a viable option in Canada's North.
- Even small-scale marine and river hydrokinetic energy systems can produce electricity at a lower cost than diesel generators.
- Marine and river hydrokinetic energy systems can create local job opportunities.

Key considerations when implementing this technology

- Further research is still needed to study the potential impacts of marine and river hydrokinetic energy systems on fish, marine mammals, and other aquatic life.
- Log jams and ice build-up can have a big impact on water flow and, in turn, energy generation.
- Studies on river flow, tidal ranges and wave heights will need to be done first to determine if marine and river hydrokinetic energy is practical for your community.
- Communities with long coastlines and fast, steady moving water in rivers and oceans are ideal for marine and river hydrokinetic energy systems.
- The upfront costs and maintenance requirements will depend on the specific river or ocean conditions in your community.

The bottom line Marine and hydrokinetic energy systems, including tidal, wave and river hydrokinetic, offer a sustainable and predictable power source that can help Northern and remote communities reduce their use of fossil fuels like diesel.

Want to learn more?

For more information, please send us an email:
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[1] The levelized cost of electricity (LCOE) measures the lifetime costs of running an energy source divided by how much energy it produces over that span (typically in megawatt-hours).

[2] Estimated range of LCOE for tidal in Canada ($210–$260/MWh) according to the Canadian Energy Regulator. (2022). Canada's Adoption of Renewable Power Sources – Energy Market Analysis. https://www.cer-rec.gc.ca/en/data-analysis/energy-commodities/electricity/report/archive/2017-canadian-adoption-renewable-power/canadas-adoption-renewable-power-sources-energy-market-analysis-costs-trade-offs.html. Additional costs may apply depending on location.

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