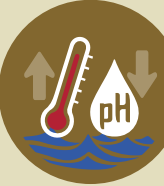
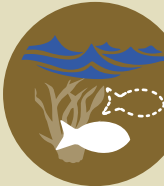





The Global Need for Adaptation Goods and Services

Spotlight on Ocean Technologies

The ocean technologies sector is an advanced-technology and knowledge-based industry focused on products and services to understand, work in or use the ocean.

It supplies several industries, including marine transportation; defence and security; coastal and oceans management; fisheries and aquaculture and offshore energy and mining. These activities are likely to become more difficult to plan, design and operate as climate change intensifies!

 <p>OCEAN CHEMISTRY Rising temperatures and ocean acidification impacting ocean ecosystems.</p>	 <p>ECOSYSTEM IMPACTS Changing marine conditions impact ocean ecosystems and fisheries.</p>	 <p>EXTREME WEATHER More intense high winds and increased wave heights affect ocean activities offshore.</p>	 <p>SLR & EROSION Sea level rise, storm surge, and coastal erosion impacting coastal infrastructure.</p>	 <p>SEA ICE Decreasing sea ice could increase maritime traffic but ice breakup presents navigational hazards.</p>
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There is a significant international need for climate adaptation solutions

Adaptation Goods & Services In This Sector

- Shipping & Navigation Support
- Coastal Engineering
- Marine Condition Forecasting & Adaptation
- Climate Change Adaptation
- Marine Management, Scientific, & Technical Consulting

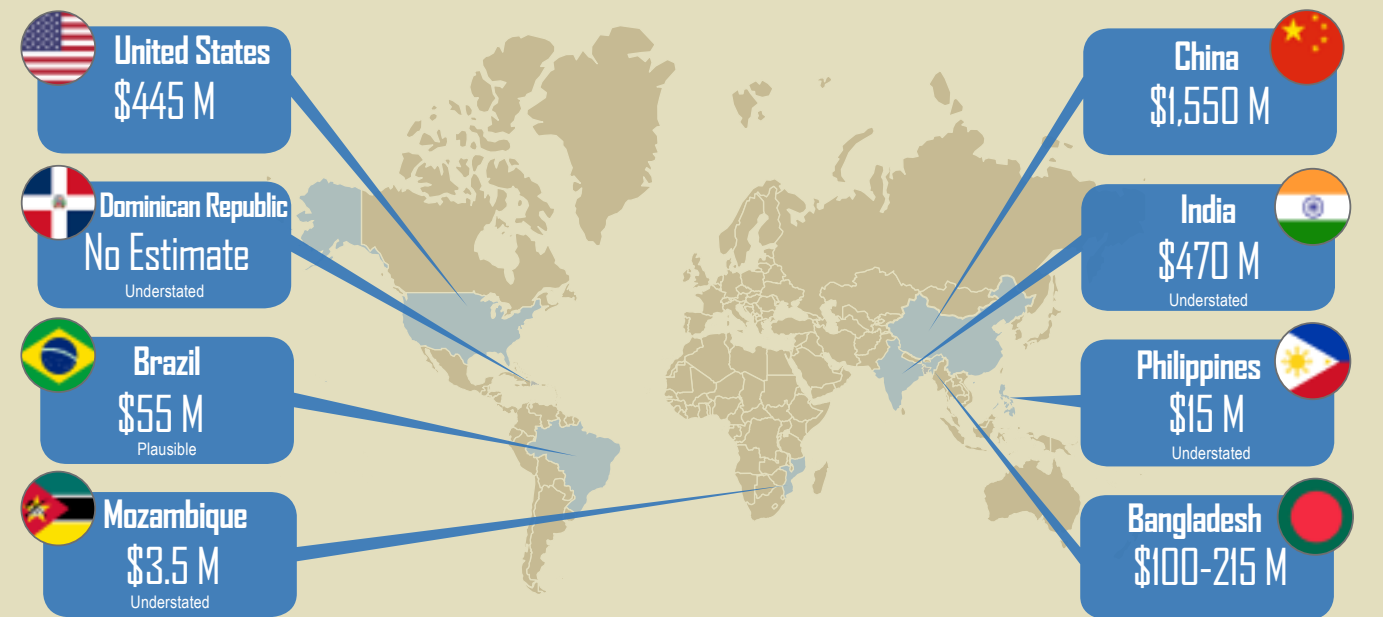


The ocean economy is projected to double in size by 2030²

Adaptation goods and services in this sector contribute to the growing ocean economy by managing risks and taking advantage of opportunities resulting from climate impacts like ocean warming, acidification, changes in oxygen levels and nutrients, sea level rise, declining sea ice and more frequent and / or intense extreme events. They relate to: monitoring the ocean environment, forecasting & modelling the ocean environment, managing marine hazards / maritime security and managing ocean ecosystems.

Adaptation Outlook

Demand for ocean technologies as the climate changes will come primarily from countries with coastlines of economic and social importance.³ For example, the UNFCCC forecasts that additional investment in research and development and extension for adaptation to climate change in fisheries could reach CAD 302 million in 2030.⁴ New research by Deloitte and ESSA, focused on eight target countries, estimates that total spending on adaptation in the ocean technologies sector could reach CAD 2.7 billion by 2035.



Forecasted adaptation spending in the ocean technologies sector for 2035 (CAD million, based on current estimates of % of GDP by sector, rounded to two significant figures) by Deloitte and ESSA (2016)

How is Canada Positioned to Help?

Canada's share of the CAD 2 trillion global ocean economy stands at about 1%.² Canada's share of the global adaptation market in this sector is unclear but likely proportionate to our share of the global ocean economy. Canada has several strengths in the ocean technologies sector that position us well to compete in the global marketplace for adaptation goods and services as it develops:

- 1 Strong investment in science and research**
Canada is home to 42 major ocean research institutes and organizations, four regional ocean technology clusters, and many private-sector firms undertaking much of the research related to defense and security, offshore energy and marine transportation.^{5,6}
- 2 Our experience in offshore oil and gas, marine surveillance and environmental monitoring in harsh environments as well as ice navigation**
Opportunities in marine shipping, marine and coastal tourism and resource use (energy, fisheries) in the Arctic show great potential.²
- 3 Canada's reputation as a collaborator on global ocean governance**
Pursuit of multilateralism and growing environmental awareness is paving the way for integrated ocean and coastal management approaches, including new regulatory regimes, and opens opportunities for profiling Canadian solutions.⁶

“Canada has great teaching institutions that are graduating individuals who will be employable in the ocean technologies of the future as they evolve due to climate change.”
– Interview respondent



For more information

Information in this infographic stems from a 2016 report commissioned by Natural Resources Canada that scopes the need for adaptation goods and services to international markets. The research combines analysis of trade and economic data, literature reviews and the perspectives of sixteen subject-matter experts. The full report is available at <http://www.adaptationlibrary.ca/#/option/482#top>

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