

# Building Canada's tidal energy industry



marine  
renewables  
canada

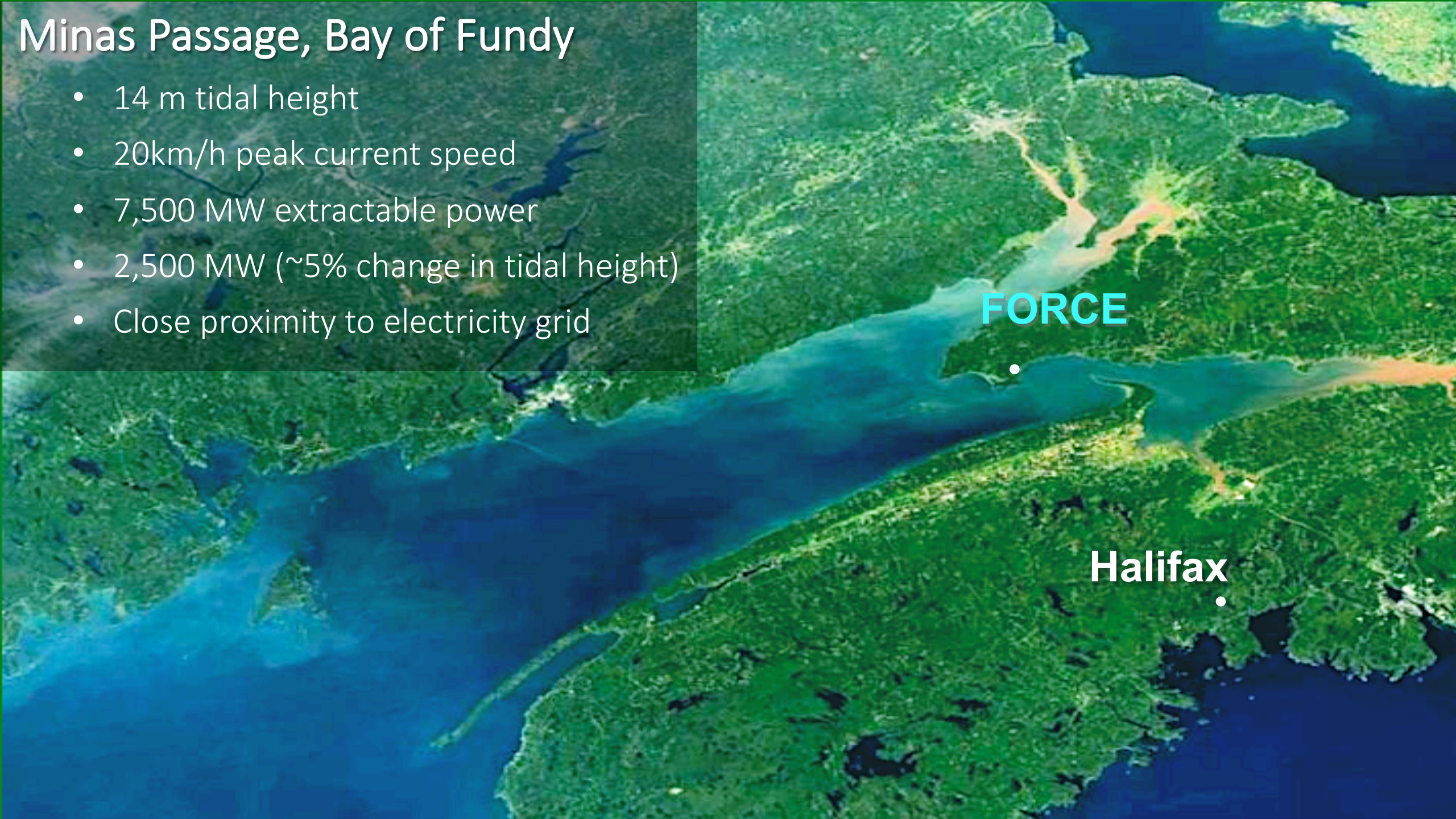
Elisa Obermann, Executive Director





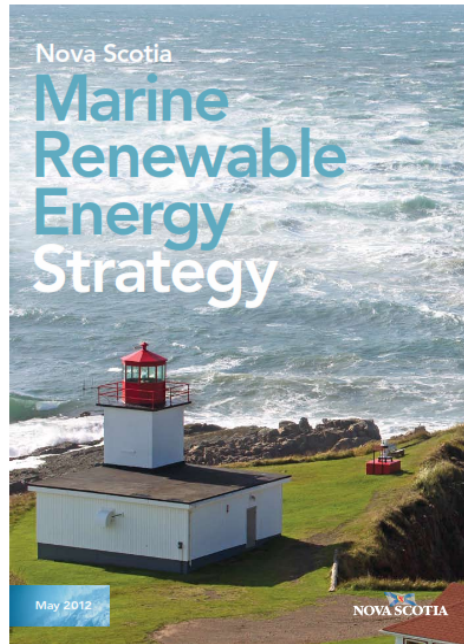
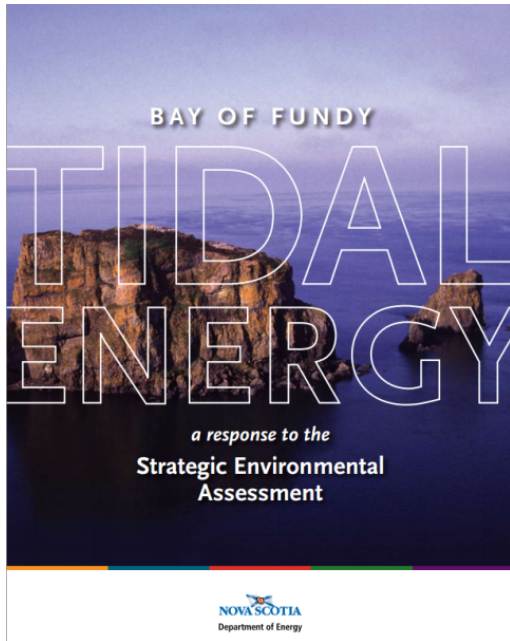
# Minas Passage, Bay of Fundy

- 14 m tidal height
- 20km/h peak current speed
- 7,500 MW extractable power
- 2,500 MW (~5% change in tidal height)
- Close proximity to electricity grid





# Nova Scotia: Creating the conditions



Legislation

SEAs

Enabling research

Supply chain support

Test centre



**300 MW**

by 2020 strategy goal



**\$75M+**

Public sector investment  
to de-risk



**\$0.53 kW/hr**

Market Driver – FIT

# FORCE: Fundy Ocean Research Center for Energy



## ROLE

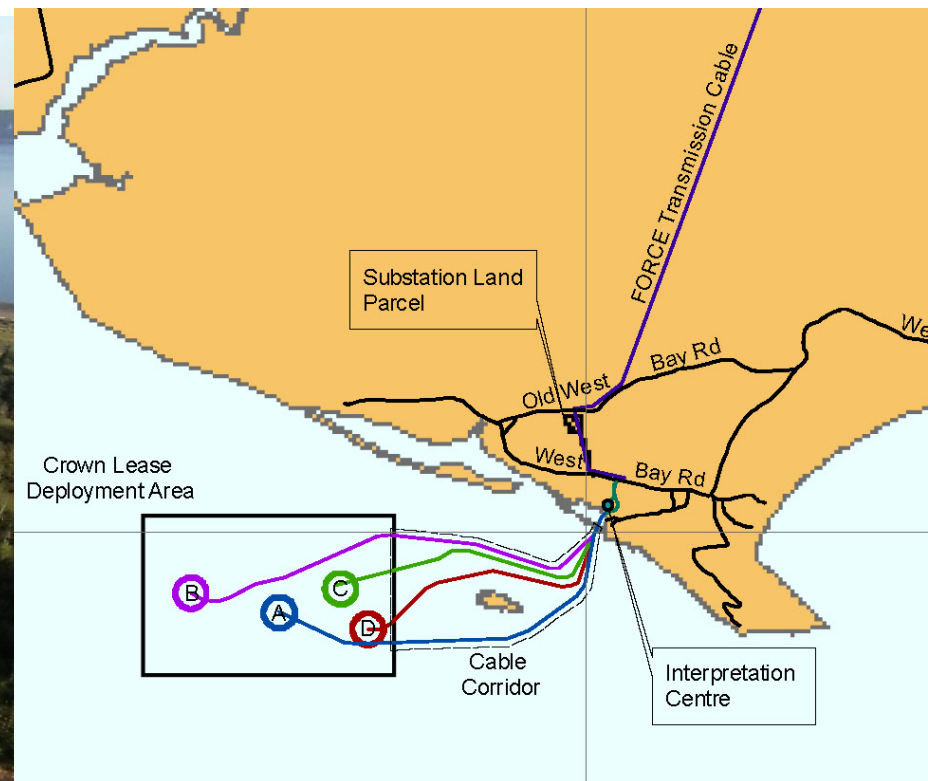
- Host
- Steward

## OFFSHORE

- 64 MW subsea cable (4x16)
- EA approval for site
- Site and current data

## ONSHORE

- 10 km transmission line
- Substation + equipment
- Visitor/observation facility



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# Enabling Innovation

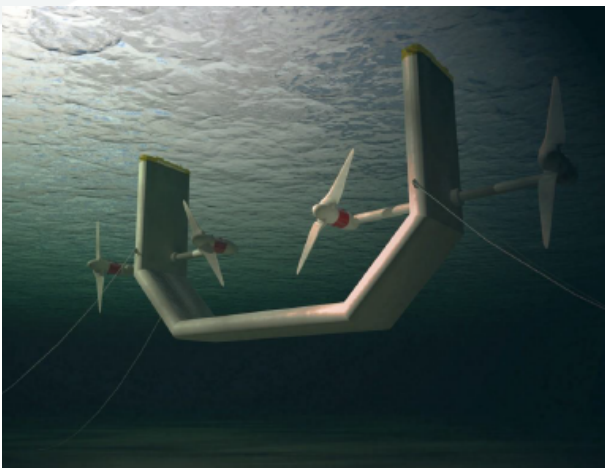
## Fundy Advanced Sensor Technology (FAST) Platform

- Onshore and offshore instruments to support innovation in site characterization, monitoring, and improving marine operations
- Subsea data collection, subsea data cable installation, shore-based radar & meteorological equipment, platform fabrication, instrumentation and deployment

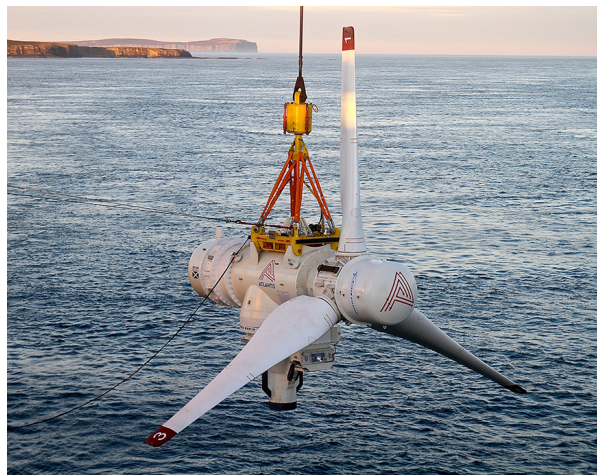




Minas Tidal



Atlantis Operations Canada



Halagonia Tidal Energy



Black Rock Tidal Power



Cape Sharp Tidal Venture





# Cape Sharp Tidal deployment November 2016

2 MW turbine at FORCE =

- 70% local content
- 300 people working full-time
- \$33+ million in contract awards to local supply chain



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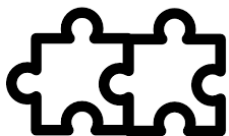
# Growing the Supply Chain: 300+ involved



1. ABB Limited (Euro Account)	59. Croyden Wood Sr & Family	115. Hammurabi	173. MayRay Tech Consulting	229. Pumps Plus	285. Steltech Custom Metal Construction
2. ABCO Industries	60. CulOcean Consulting	116. Harbourview Restaurant	174. MC Materials Ltd	230. QPS Evaluation Services Inc	286. Strescon Limited
3. Acadia University	61. Cumberland Energy Authority	117. Harrison's Home Hardware	175. Mi'kmaw Conservation Group	231. Quadrule Consulting	287. Strum Engineering Associates Ltd
4. Acadian Printing	62. Dalhousie University	118. Hawboldt Industries	176. McCullough Environmental	232. Quality Blasting & Coating Ltd	288. Sunshine Inn
5. Access Security	63. Dan Martin Metal Works	119. Hercules SLR	Engineering	233. Quality Blasting and Casting	289. Superior Machining Limited
6. ACE Towing	64. DASCO	120. Hertz Equipment Rental	177. McGregor Geoscience	234. Quantum Communications	290. Surrette
7. AECOM	65. DCM Compliance Ltd	121. Hillswood Management Solutions	178. McInnes Cooper	235. Queen's University	291. Tecnadyne
8. AECON	66. Deloitte	122. Himmelman Elastomers Ltd	179. Membertou Geomatics Consultants	236. Quoceant	292. TEK Map
9. Aggreko Canada Inc	67. Demesne Electrical Sales Ltd	123. Hughes Offshore Services	180. Mersey Consulting	237. QVISTO Inc (NS Webcams)	293. The Delphi Group
10. Air Repaid Sales & Service Ltd	68. DM Mechanical & Pipe Installations	124. Huntley's Sub-Aqua Construction	181. Metals 'R' Us	238. R P Hawboldt	294. The Hall, Parrsboro
11. All Sea	69. DNV GL	125. Huntsman	182. Michael Keen	239. Radionics Ltd	295. The Parrsboro Mansion Inn
12. Allswater	70. Dominion Diving	126. HW-Elektrotechnik	183. Rafes Fire Safety	240. Rafes Construction Ltd	296. The Reliance Bearing & Gear Co
13. Alscott	71. Don Brenton's	127. Hydra-Fab Industrial Inc	184. Mil-Aero Electronics Inc	241. Rainbow Net & Rigging	297. The Sunshine Inn
14. Alstom	72. DR Martin's Metal Works	128. IKM Testing (Canada) Ltd	185. MilAero	242. Randy Corcoran	298. The TeeShirtery
15. Altair	73. DSA	129. Impact	186. Mills Heavy Hauling	243. Ray McCormick and Sons	299. Thor Shipping & Transport BVBA
16. AON/ Aon Reed Stenhouse Inc	74. DSTN	130. Inerjys	187. Minas Energy	244. Rayworth & Roberts Surveys	300. Tidal River Ridge
17. Armstrong's Communication Ltd	75. Dwight MacGillivray Welding & Metal	131. Inishowen Engineering Manufacturing	188. MITACS	245. Ready John	301. Tim Horton's Parrsboro
18. Arlene Canning Fuels	Fabricating Ltd	132. Instrument Concepts	189. Mulgrave Machine Works	246. Rideout Tools	302. TJ Engineering and Inspecting
19. ASL Environmental	76. Earle MacAloney Excavation	133. Integral Electrical Services Ltd	190. Natural Resources Canada	247. RJ MacIsaac	303. Tom Windeyer
20. Atlantic Marine & Industrial Rigging	77. East Carolina University	134. Interlink Ireland Limited	191. Network International	248. RMI Marine Limited	304. Torpedo Ray
21. Atlantic Marine Geological Consulting	78. East Coast Pumps	135. International Telecom	192. NEXUS Coastal Resources	249. Rochling Sustaplast SE & Co KG	305. Total Source Ltd
22. Atlantic Towing	79. Eastern Foundry	136. Irving Oil Parrsboro	193. Nicom	250. Rockland Scientific	306. Total Transport & Rigging
23. Atlantis Resources	80. Eastlink	137. Irving Shipbuilding	194. Nitronica Limited (Euro Account)	251. ROMOR Atlantic	307. Trans Industrial Packaging
24. Atlantis Watershed Consultants	81. Emera	138. J C Mechanical	195. Nortek UK	252. Ropeblock B V	308. Trelleborg Sealing Solutions Canada
25. AW Leil Cranes & Equipment	82. Emerald Freight	139. J&K Electric (Amherst)	196. North Atlantic Marine Supplies &	253. RPM Productions	309. Tritech International Ltd
26. Axis Mobility Limited	83. EMO Marine Technologies	140. James Fisher Marine Services	Services Inc	254. RSA Canada	310. Triton Consultants Ltd
27. AZZ	Ltd/MacArtney Canada	141. James Walker Ireland	197. Northumberland Electric	255. Russel Metals Inc	311. Trivium Design
28. Balltec Ltd	84. Energy Systems Design Ltd	142. JASCO Applied Sciences	198. Nova Scotia Community College	256. S Stewart's Excavation &	312. Tullamex International Ltd
29. BBC-Chartering	85. Enginuity	143. JL MAG Rare-Earth Co Europe	199. Nova Scotia Power Inc	Construction	313. Turmec Teoranta
30. Bell Mobility	86. Envigour	144. Joe Babineau	200. NRC Canadian Hydraulics Centre	257. Safety First (Fred Leafloor)	314. Ultra Electronics Maritime
31. Bellew Electrical Ltd	87. EnviroSphere Consultants Ltd	145. K & D Pratt	201. Oadby Plastics Ltd	258. Safway Services Canada	315. United Rentals
32. Bio-Identification Associates	88. Epsilon Optics	146. K Fasteners	202. Ocean Networks Canada	259. Saint John Port Authority	316. University of Maine
33. Black Rock Bistro	89. ESI	147. Kehoe Engineering & Consulting Ltd	203. OceanMoor Technical Services	260. Saint Mary's University	317. University of Victoria
34. Black Rock Tidal Power	90. ETA	148. Keltic Falcon	204. Ocean Sonics	261. Samantha McCrindle	318. Valley Communications
35. Block UK Ltd	91. European Marine Energy Centre	149. Kintetsu World Express	205. Ocean Tracking Network	262. SCHOTTEL Hydro	319. Van Mechelen Lifting Gear B V
36. blue C designs	92. Evangeline's Tower B&B	150. Knowlton & Newman	206. Oceans Array Systems Limited	263. Scientific Management Associates	320. Velocity Machining & Welding
37. Blumara Corp	93. Falmat Inc	151. Kongsberg	207. Oceans Ltd	264. Scorpion Oceanics Limited	321. Vemco
38. Bourque Industrial	94. Femto Electronics Ltd	152. Krylen Design	208. Oceanscan Limited	265. Scotfab Limited	322. VistaCare
39. Braemar Fire & Safety, Braemar	95. Fisheries and Oceans Canada	153. KWE	209. Oceanside Equipment Limited	266. Scotia Harvest Seafood	323. WaJax Equipment
Services Systems Inc	96. Fishers	154. L&J Sanitation Supplies	210. OceanWorks	267. Sea Mammal Research Unit Ltd	324. Wajax Industrial Component
41. Bufab Ireland (Pointer Fasteners)	97. FloWave TT Limited	155. Lafarge Canada	211. Office Xperts Inc	268. Seaforth Geosurveys Inc	325. Wbli
42. Cape Sharp Tidal	98. Focal Technologies: A Moog Co.	156. Lengkeek Vessel Engineering	212. Open Seas Instrumentation	269. Seaside Highspeed	326. Weir Canada Inc
43. Carter's Sports Cresting	99. FORCE	157. LG MacGillivray (Allen Hill)	213. OpenHydro	270. Shaw Precast Solutions	327. WEIR Minerals
44. CEF Consultants Ltd	100. Fothergill Engineering (GBP)	158. Lloyd's Register	214. ORMAC	271. Shiretown	328. Westlund
45. Charles E Perry Forestry	101. Frank Warren (Electrician)	159. Lockheed Martin	215. Our Little Sign Shop	272. Shiretown Home and Auto: Auto	329. Wheaton's Irving
46. Cherubini Metal Works Limited	102. Fraser and Hoyt Insurance	160. Luna Ocean Consulting Ltd.	216. Pacific International Cable Consulting	Parts Plus	330. WIAC
47. Chinforce B V	103. Frontier Technologies	161. MacFarlands	217. Phil Leil Enterprises	273. Shortt stainless steel	331. Work Authority
48. City Pavement Markings Ltd	104. Fundy Building Supplies	162. MacKeil	218. Phoenix Contact Ltd	274. Siemens	332. WPV Designs
49. Clean Current	105. Fundy Energy Research Network	163. Maple Inn	219. Polyresine SAS	275. Skyline	
50. Coda Octopus	106. Geci	164. Marine Current Turbines	220. Port of Halifax	276. SLR Consulting	
51. Composite Integration Ltd	107. GeoSpectrum Technologies	165. Marine Renewables Canada	221. Port of Pictou	277. Source Atlantic	
52. Composites One LLC	108. Gillespie House Inn	166. Mariner Forge	222. Power Promotional Concept	278. Spar Marine Ltd	
53. Concertia	109. Glas Ocean	167. Mark Taylor	223. Powerpoint Engineering Limited	279. Spartan Industrial Marine	
54. Connors Diving	110. Glooscap Restaurant	168. Markland Associates Ltd	224. Princess Auto	280. SRP	
55. Container & Trailer Services Ltd	111. Go Glass	169. MARTEC	225. Pro Tech Anchors Inc	281. SSAB Europe Oy	
56. Creative Textile Solutions	112. Gurit	170. Martec Limited	226. Project Management Limited	282. St John Ambulance	
57. CRIST Offshore Sp	113. H&MV Engineering Ltd	171. Math Resources Inc	227. Proudfoots Home Hardware	283. Stantec	
58. Crossroads Co-op	114. Habia Cables Ltd	172. Mavi Innovations Inc	228. Prysman	284. Steel Detail Solutions	



# Making it happen



## Leadership

- › Pieces of the puzzle in place in Nova Scotia

## Big picture thinking



- › 64 MW of subsea cable for future build-out
- › Attracting world-leading developers
- › Building experience in the local supply chain

## Momentum critical



- › Affects stakeholder perceptions and attitudes
- › Sends signals to suppliers and affects engagement
- › Demonstrates benefits



# What's next

- **Upcoming deployments** | Cape Sharp Tidal preparing for deployment spring/summer 2018
- **New players** | Nova Scotia established new 10 MW permitting program for technology demonstration
- **New investment** | Government of Canada to announce successful applicants of \$200M emerging renewable power program



FOR MORE INFORMATION

[www.marinerenewables.ca](http://www.marinerenewables.ca)



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