NOVA SCOTIA
Energy and Mines

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May 15, 2019

Mr. Mark Savory
VP Project Delivery & Commercial
Sustainable Marine Energy (Canada) Ltd.
115 – 200 Waterfront Drive
Bedford, Nova Scotia B4A 4J4

Dear Mr. Savory,

Re: Marine Renewable-energy Licence – No. 2019-001 Issued to Sustainable Marine Energy Canada Ltd. Registry of Joint Stock Companies ID No. 3275789

I am pleased to present you with a marine renewable-energy license for construction, installation, operation and decommissioning of three (3) in-stream tidal energy generators with an aggregate nameplate capacity of 1.26 megawatts to be deployed in the FORCE Marine Renewable-electricity Area, Bay of Fundy, Nova Scotia (Licence Number 2019-001). This licence is issued in accordance with Section 30 of the *Marine Renewable-energy Act as* related to generators associated with Sustainable Marine Energy (Canada) Ltd.'s developmental tidal array feed-in tariff (FIT) approval FIT-B-001.

Please note that failure to meet or otherwise breach requirements of the Licence, the Act or its regulations, your FIT approval or the terms of your PPA, can result in legal remedies being taken by the Province including being subject to an order, a suspension or revocation of this Licence.

Pursuant to section 26 of the *Marine Renewable-energy General Regulations*, annual rents and fees prescribed in section 23 of the Regulations are waived for two years.

Be aware that pursuant to Section 46 of the Act, any proposal for a modification, relocation or other change to the project and licence require prior review and approval by the Province.

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If you have any questions regarding the licence, or if we can be of further assistance to you, please contact the Program Administrator at 902-424-7090 or via email at marinerenewables@novascotia.ca.

Sincerely,

Derek Mombourquette
Minister

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MARINE RENEWABLE-ELECTRICITY LICENCE

Province of Nova Scotia
Marine Renewable-energy Act

LICENCE HOLDER:	Sustainable Marine Energy (Canada) Ltd.
LICENCE NUMBER:	2019-001
EFFECTIVE DATE:	May 15, 2019
EXPIRY DATE:	December 17, 2020

Pursuant to Section 30 of the *Marine Renewable-energy Act*, a Licence granted to the Licence Holder is subject to the Terms and Conditions attached to and forming part of this Licence, for the following activity:

Construction, installation, operation and decommissioning of three (3) in-stream tidal energy generators with an aggregate nameplate capacity of 1.26 megawatts at Berth C within the FORCE Marine Renewable-electricity Area.

For greater certainty, the activity authorized under this Licence and its terms and conditions is subject to the *Marine Renewable-energy Act* and its regulations.

Derek Mombourquette
Minister

May 15/19
Date Signed

NOVA SCOTIA

MARINE RENEWABLE-ELECTRICITY LICENCE
TERMS AND CONDITIONS

Province of Nova Scotia
Marine Renewable-energy Act

LICENCE HOLDER:	Sustainable Marine Energy (Canada) Ltd.
LICENCE NUMBER:	2019-01
EFFECTIVE DATE:	May 15, 2019
EXPIRY DATE:	December 17, 2020

Terms and Conditions of License Approval
This approval is subject to the following conditions and obtaining all other necessary approvals, permits or authorizations required by municipal, provincial and federal acts, regulations and by-laws before constructing, installing, operating and decommissioning any device at Berth C within the FORCE Marine Renewable-electricity Area.

Licence

The following schedules are attached to and form part of this Licence:

- Schedule A - Sustainable Marine Energy (Canada) Ltd. Technical Description;
- Schedule B - Survey of Berth C;
- Schedule C - Project Plan; and
- Schedule D - Insurance Requirements.

The terms and conditions of this Licence document shall prevail over the Schedules.

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Definitions:

Terms which are defined in either the *Marine Renewable-energy Act* or its regulations have the same meaning in these terms and conditions, unless otherwise provided.

In this Licence:

"Commercial Operation" means the completion of the design, construction and commissioning of the Generation Facility as defined in your Power Purchase Agreement with Nova Scotia Power Incorporated;

"Decommissioning, Abandonment and Rehabilitation Plan" means the decommissioning, abandonment and rehabilitation plan required by subsection 44(2) of the *Marine Renewable-energy Act* and provided to the Minister in accordance with sections 19 and 20 of the *Marine Renewable-energy General Regulations*;

"Deployment" means the placement of a device or associated equipment in position ready for use;

"Effective Date" means the date that this Licence is effective, as noted at the head of this document;

"Generation Facility" means one or more device(s) described in the Project Plan and Schedule A, together with all protective and other associated equipment and improvements as may be modified from time to time pursuant to the terms of this Licence;

"Fees Regulations" means the *Marine Renewable-energy Fees Regulations*;

"Minister" means the Minister of Energy and Mines for the Province of Nova Scotia;

"MRE Act" means the *Marine Renewable-energy Act*;

"NSPI" means Nova Scotia Power Incorporated;

"Licence Area" means the area of submerged land for which the specific location has been determined by survey and defined as Berth C and as contained in Schedule B of this Licence;

"Licence Holder" means Sustainable Marine Energy (Canada) Ltd.;

"Program Administrator" means a representative of the Nova Scotia Department of Energy and Mines who has been assigned to receive information on the Department's behalf with respect to this Licence;

"Project Plan" means the project plan attached as Schedule C;

"Regulations" means the *Marine Renewable-energy General Regulations*;

"Technical Description" means the description of the technology contained in Schedule A of this Licence;

1.0 Scope of Approval

1.1 *Project Details.* This Licence is limited to the project as described in the schedules attached to and forming part of this Licence.

1.2 *Project Technology.* The Licence for the project is limited to the technology as described in the schedules attached to and forming part of this Licence and limited to the aggregate nameplate capacity first stated above.

1.3 *Licence Area.* The Licence Area is Berth C (**12.9208** hectares) as set out in Schedule B. Generator(s) authorized under this Licence shall be constructed, installed and operated wholly within the Licence Area.

1.4 *Development and Operation.* The Licence Holder shall develop and operate the project as described in the Project Plan attached to and forming part of this Licence as Schedule C.

1.5 *Precedence of legislation.* In the event of a conflict between the MRE Act and its regulations and the terms and conditions of this Licence, the MRE Act and its regulations shall prevail.

2.0 General Terms and Conditions

2.1 *Renewal eligibility.* To be eligible to renew the term, the Licence Holder must have fulfilled its obligations under this Licence, MRE Act and its regulations and shall submit and receive written approval of a new project

plan for the coming renewed term in accordance with the requirements of the MRE Act and its associated Regulations.

2.2 *Other Approvals, Permits and Authorizations.* This Licence is subject to the terms and conditions herein, and the Licence Holder obtaining and maintaining all other necessary approvals, permits or authorizations under municipal, provincial and federal acts, regulations and by-laws, including, but not limited to, the power purchase agreement with NSPI.

2.3 *Feed-in Tariff Approvals.* Without limiting the generality of 2.2, the Licence Holder must be in good standing with its Developmental Tidal Array Feed-in Tariff Approval FIT-B-001.

3.0 Commercial Operation Deadline/Term of Licence

3.1 The Licence Holder shall reach Commercial Operation on or before December 16, 2020 and shall notify the Department and NSPI upon meeting that milestone.

3.2 This Licence is valid from the date of issuance and expires on December 17, 2020.

4.0 Environmental Monitoring Plan

4.1 The environmental monitoring plan (EMP) must be developed using relevant baseline data and identify appropriate environmental effects indicators. The plan shall consider project effects on, but not limited to, the following:

- fish and lobster;
- marine birds;
- marine mammals;
- acoustics;
- physical oceanography;
- currents and waves; and
- benthic environment.

The EMP shall include contingencies to be implemented as alternative courses of action in the event mitigation and/or monitoring activities cannot

be implemented, are not functioning as designed or do not provide expected results.

4.2 Unless otherwise approved, the Licence Holder shall submit an EMP to the Program Administrator for review and approval at least thirty (30) days prior to deployment as set out in the Project Plan. The License Holder must implement and adhere to this approved EMP upon approval.

4.3 The Licence Holder shall update and revise the EMP to reflect best available and economic practices, methods, and technologies respecting environmental monitoring; changes in the Project Plan and circumstances of the project; and changes in the knowledge of, or actual changes in the physical, ecological, and environmental circumstances and impacts of the project. When the EMP has been updated, the License Holder must submit it to the Program Administrator for approval.

4.4 The License Holder shall submit an initial status report on environmental monitoring equipment functionality to the Program Administrator prior to turbine operation and shall notify the Program Administrator of any malfunction or non-functioning of the environmental monitoring equipment within twenty-four (24) hours.

4.5 Environmental effects monitoring reports shall be submitted in writing to the Minister every six (6) months from deployment or upon a modified schedule as approved under the EMP.

4.6 Upon knowledge of serious harm to marine mammals, fish, marine invertebrates, and marine birds, the Licence Holder shall, without unreasonable delay, notify the Program Administrator and the Department of Fisheries and Oceans Canada.

5.0 Engagement Requirements

5.1 *Mi'kmaq Engagement Plan.* The Licence Holder shall not construct or install a generator, cable or other equipment or structure in the Licence Area until the Licence Holder has submitted and the Minister has approved a Mi'kmaq Engagement Plan. The plan shall outline ongoing and proposed engagement activities with the Mi'kmaq of Nova Scotia and shall include, as a minimum, a description and general schedule of activities under the authority of the Licence. The Licence Holder shall implement the plan following its approval. The plan shall be updated and resubmitted annually

to the Minister for approval on or before January 31st throughout the term of this Licence.

5.2 The License Holder shall support the Province of Nova Scotia in its future and ongoing consultation processes with the Mi'kmaq of Nova Scotia, share information the Minister considers necessary or advisable, with the Mi'kmaq of Nova Scotia, and consider implementing mitigation and accommodation measures to address any issues raised through consultation.

5.3 *Stakeholder Communication and Engagement Plan.* The Licence Holder shall not install any generator, including any cable or any other equipment or structure owned by the Licence Holder and used or intended to be used with the generator, before submitting a stakeholder communication and engagement plan to the Minister for approval. The plan shall outline ongoing and proposed engagement activities with stakeholders and shall include, as a minimum, a description and general schedule of activities under the authority of the Licence. The Licence Holder shall implement the plan following approval. The plan shall be updated and resubmitted annually to the Minister for approval on or before January 31, throughout the term of this Licence.

6.0 Reporting Requirements

6.1 *Deployment Notice*. The Licence Holder shall notify the Program Administrator at least thirty (30) days prior to the Deployment or the testing of generator(s) or equipment under the authority of the Licence.

6.2 *Deadlines for Activity Reports*. In accordance with Section 13 of the Regulations, the Licence Holder, throughout the term of the Licence, shall submit quarterly written reports ("Activity Reports") to the Minister detailing the activities carried on under the authority of the Licence:

a. by January 31, for activities between November 1 and January 31;
b. by April 30, for activities between February 1 and April 30;
c. by July 31, for activities between May 1 and July 31; and
d. by October 31, for activities between August 1 and October 31.

6.3 *Content of Activity Reports*. At a minimum, the Activity Reports shall include:

a. Detailed and up-to-date project schedule;
b. Status update on operational aspects of the project;
c. Operational capacity factor for each generator and calculation methodology;
d. Progress updates on the activities outlined in the project schedule;
e. Detailed and up-to-date procurement schedule;
f. Amended procurement deadlines;
g. Summary of any entities procured for goods/services;
h. Financial statements related to procurement, construction, operations, and monitoring activities, with audited financial statements included at least once per calendar year;
i. Data relating to socio-economic matters;
j. Lessons learned deemed beneficial to the sector; and
k. Any changes to the corporate structure of the Licence Holder or its major shareholders, including but not limited to changes of domicile, management, and corporate governance.

6.4 *Event notification.* The Licence Holder shall notify the Program Administrator within ten (10) business days upon reaching the following milestone(s):

a. Receipt of any federal, provincial, or municipal regulatory approvals;
b. Approval of additional funding or grants;
c. Completion of any NSPI grid interconnection activities;
d. Connection to the transmission or distribution grid;
e. Issuance of any manufacturing or fabrication contracts;
f. Installation of a generator and any cable or other equipment or structure used or intended to be used with a generator;
g. Reaching commercial operation as defined by the the power purchase agreement;
h. Achieving 9% capacity factor;
i. Achieving 35% capacity factor;
j. Commencement of decommissioning activities; and
k. Completion of decommissioning and rehabilitation activities.

6.5 *Press release notification.* The Licence Holder shall notify the Program Administrator at least one (1) business day prior to any press release related to the activities authorized under the Licence.

6.6 *Officer's and Director's Certificates.* The Licence Holder shall provide an officer's or director's certificate attesting to the truth, accuracy and

completeness of any report and submission required under this Licence, or attesting to matters of compliance with this Licence.

7.0 Incident Reporting

7.1 The License Holder shall provide the Program Administrator, within seventy-two (72) hours, a report of any significant adverse environmental effects, accident or near miss, generator malfunction or impact to human health or safety together with a description of the response.

7.2 The Licence Holder shall notify the Program Administrator at least one (1) business day in advance of any press release or press-conference related to an incident or near-miss.

7.3 The Licence Holder shall ensure that:

a. Any incident or near-miss is investigated, its root cause and causal factors identified where possible and corrective action taken where applicable; and

b. Any incident or near-miss is investigated, its root cause, causal factors and corrective action taken must be submitted in a report to the Program Administrator no later than thirty (30) days after the day on which the incident or near-miss occurred.

8.0 Risk Management Plan

8.1 Unless otherwise approved, the Licence Holder shall submit a Risk Management Plan to the Program Administrator for review and approval at least six (6) months prior to installation of a generator, cable or other equipment or structure authorized by this Licence.

8.2 The Licence Holder shall not construct or install a generator, cable or other equipment or structure authorized by this Licence, until the Licence holder has submitted, and the Minister has approved, a Risk Management Plan. The Licence Holder shall implement and adhere to the Risk Management Plan following approval.

8.3 The Risk Management Plan must be developed using relevant project information and shall contain all the information listed in Section 18 of the Regulations.

8.4 The Risk Management Plan shall be updated and resubmitted annually by the License Holder to the Minister on or before January 31, throughout the term of the License.

9.0 Decommissioning, Abandonment and Rehabilitation Plan

9.1 Unless otherwise approved, the Licence Holder shall submit a Decommissioning, Abandonment and Rehabilitation Plan to the Program Administrator for review and approval at least six (6) months prior to installation of a generator, cable or other equipment or structure authorized by this Licence.

9.2 In accordance with Section 19 of the Regulations, the Licence Holder shall not construct or install a generator, cable or other equipment or structure authorized by this Licence until the Licence Holder has submitted and the Minister has approved a Decommissioning, Abandonment and Rehabilitation Plan.

9.3 The Decommissioning, Abandonment and Rehabilitation Plan shall be developed using relevant project information, shall contain all of the information listed in Section 20 of the Regulations.

9.4 The License Holder shall update and revise, the Decommissioning, Abandonment and Rehabilitation Plan to reflect best available and economic practices, methods, and technology of decommissioning, abandonment and rehabilitation; changes in the Project Plan and circumstances of the project; and changes in the, or knowledge of the, physical, ecological, and environmental circumstances and impacts of the project. At the time the License Holder updates and revises the Decommissioning, Abandonment and Rehabilitation Plan, the License Holder shall submit it to the Program Administrator for approval.

10.0 Financial Security and Insurance

10.1 *Insurance*. The License Holder shall provide proof of liability insurance to the satisfaction of the Minister prior to construction or installation of a generator, cable or other equipment or structure authorized by this Licence.

10.2 *Coverage*. The License Holder shall maintain its insurance coverage in full force and effect for the term of the License and shall meet or exceed the terms and conditions as set out in Schedule D.

10.3 The License Holder shall provide financial security on terms and conditions acceptable to the Minister at least sixty (60) days prior to installation of a generator, cable or other equipment or structure authorized by this Licence.

10.4 The Licence Holder must contact the Department to ensure all mandatory terms required by the Department are included in the terms of the security instrument.

10.5 The Licence Holder shall ensure that any security provided is kept in effect throughout the Licence term. Unless otherwise required, the Licence Holder shall renew security on an annual basis and provide proof of financial security annually on or before January 31, throughout the term of the Licence.

10.6 The Minister may determine the form, and for greater certainty the terms and conditions, in which financial security is provided, including any of the following forms:

a. Electronic transfer, cash deposit, or cheques made payable to the Minister of Finance, which the Province in its absolute discretion may cash at any time;
b. Government guaranteed bonds, debentures, term deposits, certificates of deposit, trust certificates or investment certificates assigned to the Minister of Finance; or
c. Irrevocable letters of credit, irrevocable letters of guarantee, performance bonds or surety bonds in a form acceptable to the Minister.

11.0 Project Milestones

11.1 The Project Plan will be used to track material progress relating to project development. The Licence Holder shall adhere to and implement the

following schedule for construction, installation and deployment of the generators:

Table 1. Project milestones to complete construction, installation and commissioning of three (3) in-stream tidal energy generators.

Activity	Timeframe
PLAT-I Engineering complete	October 31, 2019
Obtain Fisheries Act Authorization	September 30, 2019
Financial Close SPV	September 30, 2019
Start Fabrication	November 4, 2019
Procurement and Construction Complete	May 6, 2020
Marine Operations begin	April 6, 2020
Anchors and mooring systems complete	May 29, 2020
Deployment of devices complete	June 30, 2020
Commissioning of devices	July 30, 2020
Commercial Operation of all generating facilities	October 31, 2020
Commercial Operation Date	November 30, 2020

11.2 The Licence Holder shall notify the Program Administrator within ten (10) business days following completion of project milestones listed in Table 1 (above).

12.0 Performance Requirements

12.1 The Licence Holder shall provide final as-constructed drawings of the Generation Facility and all associated infrastructure to the Program Administrator no later than ninety (90) days upon reaching Commercial Operation.

12.2 The Licence Holder is subject to the following performance targets:

a. Capability of deployed generators(s) to be operated and controlled with consistency following installation;
b. Deployed generators operating and being controlled consistently;
c. Capability of turbines, blades, and other spinning or moving components representing a risk to human or wildlife health of being stopped, halted and braked when and if required; and
d. Maintenance of an annual average capacity factor of at least 9% (nine percent) for each generator under the authority of the Licence.

12.3 The Licence Holder shall provide performance reports to the Program Administrator no later than January 31 of each year through the term of this Licence. At a minimum, the report must include the following for each generator installed:

a. Amount of energy generated;
b. Date(s) energy was generated;
c. Peak generation;
d. Capacity factor achieved and calculation methodology;
e. Number and date(s) of days deployed;
f. Number and date(s) of operating days;
g. Number and date(s) of maintenance days (planned and unscheduled);
h. The type of maintenance required; and,
i. A summary of operational issues impacting energy production or safe operation of the Generation Facility.

12.4 In the event that any generator fails to meet the annual performance standard detailed in 12.2 the Licence Holder must submit a report to the Minister outlining a reasonable time-line and plan for restoration of the generator(s) to either render it fully functional or provide details for removing the generator(s) from the License Area. The Licence Holder must implement the restoration as submitted; any change is subject to prior approval of the Minister. The Licence Holder cannot invoke this provision within three years of it being previously invoked, and not more than twice overall.

13.0 Notice to Minister and Program Administrator

13.1 Notice, documents and other information required to be sent to the Minister of the Nova Scotia Department of Energy and Mines, shall be in writing and may be served by personal service, fax or electronically, addressed to:

Attention: Minister of Energy and Mines

Nova Scotia Department of Energy and Mines
Joseph Howe Building
1690 Hollis Street
PO Box 2664
Halifax, NS B3J 3J9

Phone: (902) 424-4575
Fax: (902) 424-0528

Email: energyminister@novascotia.ca

13.2 Notice and/or information required to be sent to the Program Administrator shall be in writing and sent via email to: marinerenewables@novascotia.ca

14.0 Notice to NSPI

14.1 In the event the Licence expires, is suspended or revoked, the Minister will notify NSPI.

15.0 Standards

15.1 The Licence Holder must comply with industry standards for marine renewable energy conversion systems as they exist at the time of the issuance of this License and as amended, including but not limited to the International Electrotechnical Commission (IEC) Technical Committee (TC) 114.

15.2 At a minimum, the Licence Holder shall conduct itself with prudence and due diligence and with appropriate regard for matters of health, safety, and environment.

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Schedule A – Sustainable Marine Energy Canada Ltd. Technical Description

Platform Technology

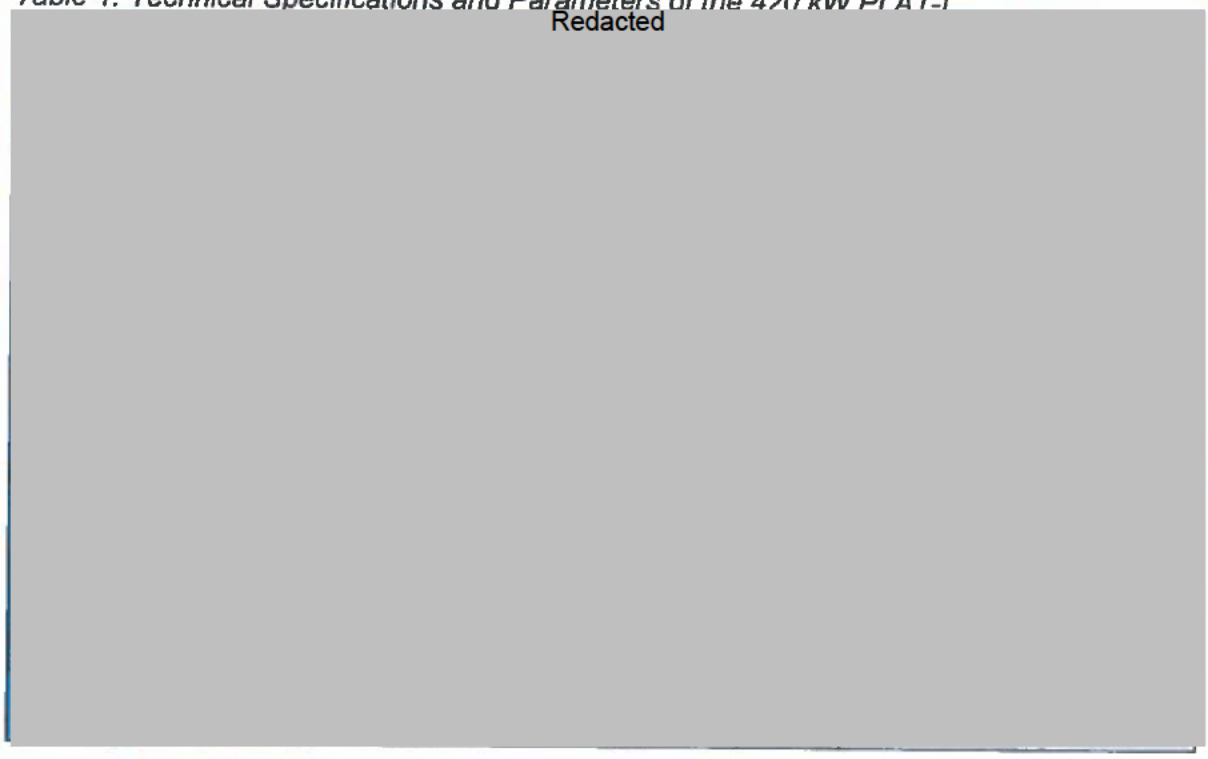
Sustainable Marine Energy Canada Ltd. (SME Canada) will deploy PLAT-I floating tidal energy platform technology at its FORCE Berth C site. The PLAT-I is designed to be installed, maintained and decommissioned utilizing modest, readily available work vessels. From an operational point of view, it is optimized for sites with low to moderate wave exposure such as FORCE, with its robust construction moored via a turret configuration allowing it to passively weather-vane with the tide.

Characteristics of the 420 kW PLAT – I include:

- Pivots on two-point catenary mooring spread
- Two Raptor rock anchors
- Stud link mooring chains connected to each anchor
- Mooring spread holds turret in geostationary position
- Simple aluminium-bronze bearings allow free yaw/flow alignment
- Swing-up SIT Deployment Modules (SDMs) allow easy turbine access
- Turbines kick-up to reduce loading and pass trapped debris
- Electrical power from individual turbines conditioned onboard
- Onboard transformer steps up voltage before export
- Turret slip ring for electrical / communication connection to export cable

Figure 1: Installed Condition of PLAT-I

Table 1: Technical Specifications and Parameters of the 420 kW PLAT-I



Technology to be Deployed within the FORCE MREA

A detailed Front-End Engineering Design (FEED) study was carried out by SME Canada (formerly Black Rock Tidal Power Inc.), SME (Scotland) and Schottel Hydro (SHY) during Q1 2018. The FEED determined that an augmented version of the PLAT-I platform is to be constructed and deployed. The platform will retain the same core geometry and principal features but will host six, rather than four, SITs and will be rated at 420kW.

The SITs mounted on board PLAT-I will utilise the same nacelle and drive train as the previous model. The rotor diameter to be utilised –between 4m and 6.3m -will be determined by analysing the results of the Grand Passage deployment. The other key technical elements of the project such as anchoring and power control will be tailored to and optimized for the project but will otherwise remain unchanged.

Anchoring and Mooring System

Each platform is intended to be anchored to the seabed with 2 x Raptor rock anchors which are mechanically secured into the seabed at pre-determined positions using a subsea drill rig called the AROV (Anchoring Remotely Operated Vehicle). The equipment was designed and built especially for these operations by SME and has been used on a number of marine anchoring operations, most recently in Connel, Scotland where 4 x Raptor 420 anchors were installed for SME's PLAT-I platform in extremely hard basalt and andesite rock.

The anchor installation system is designed to fit on the deck of a small multicat vessel (sourced locally where practicable, multicats from 23-27m LOA have been utilised thus far) with sufficient space and lifting capabilities for handling the AROV and associated equipment (main crane approx. 10t @ 12m reach). The current AROV is powered from a diesel driven hydraulic power unit situated on the deck of the vessel. The system uses environmentally friendly bio-degradable plant based hydraulic oil. Anchors are mechanically secured to the seabed via a low-impact and low noise rotary drilling operation. All drilling operations are carried out and controlled remotely from a control cabin on the deck which is equipped with a video monitoring system, a data acquisition and logging system. The AROV is powered and controlled via a simple and robust umbilical which consists of the various pressure tested hydraulic hoses along with the control and camera cables. SME are also developing a new, more powerful AROV. This will be required to install the anchors in the existing SME Canada Berth C given the complex bathymetry and higher water depth.

The mooring system is catenary mooring system attached to the anchors using shackles. SME's previous deployments using a multicat vessel supported by a dive team has been the most cost effective way of installing the mooring system. SME is currently developing a remotely operated tool to eliminate the need for divers when connecting mooring chains in deeper water.

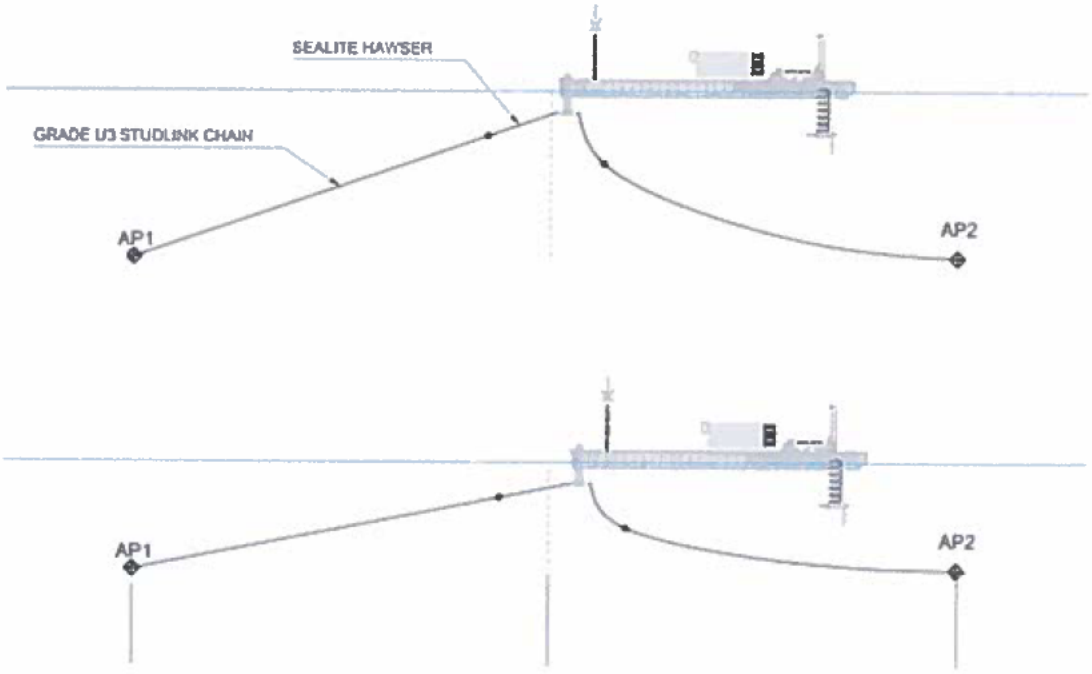


Figure 2: PLAT-I Anchor and Mooring System Arrangement

The PLAT-I installation process is a simple, efficient and low-cost process. This section describes that process as it was applied in Connel, Scotland in late 2017. The operation will be adapted for the particular conditions of the selected deployment sites at FORCE.

First PLAT-I is towed into position. The forward mooring is recovered to the surface using the crane of the vessel and line is connected to the forward hawser on PLAT-I using a shackle. The aft mooring is recovered to the surface and the line is pulled up through the turret and secured. A clacker plate in the turret safely locks the aft mooring chain in position.

Please note the figures below show a four-point mooring system rather than the two-point mooring system being proposed at FORCE.

The PLAT-I Mooring connection operation has been separated into the follow sections:

- Task 1 - Hip up alongside PLAT-I and tow to site
- Task 2 - Pick up Variable length bridle, connect synthetic hawser & turret chain
- Task 3 - Pick up Fixed length bridle and connect to PLAT-I
- Task 4 - Pick up Variable length bridle and connect to PLAT-I
- Task 5 - Disconnect Installation Vessel from PLAT-I and depart site

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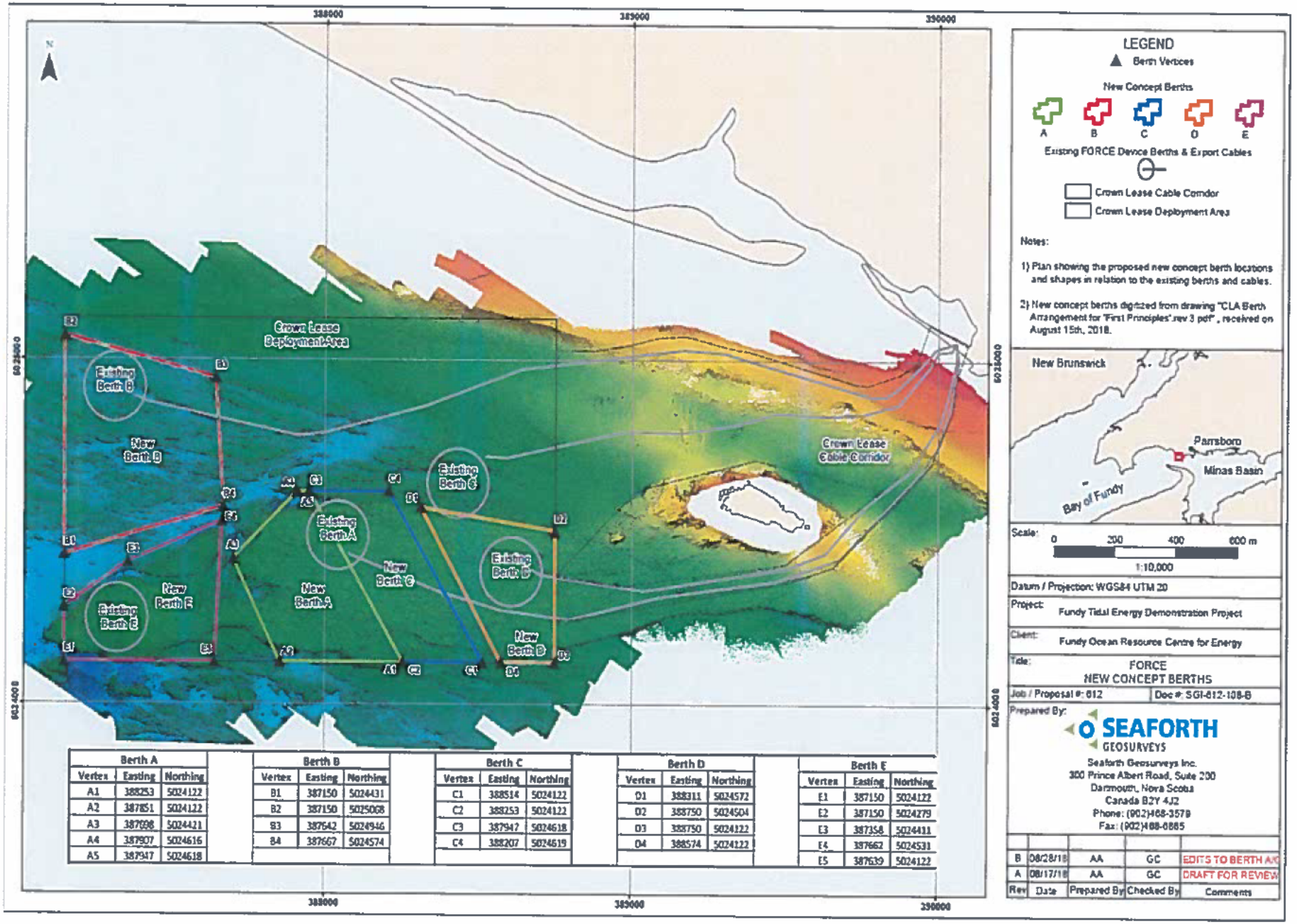
Schedule B – Survey of Berth C

Vertex	Easting	*Northing*
C1	388514	5024122
C2	388253	5024122
C3	387947	5024618
C4	388207	5024619



Berth A		
Vertex	Easting	Northing
A1	388253	5024122
A2	387851	5024122
A3	387698	5024421
A4	387907	5024616
A5	387947	5024618

Berth B		
Vertex	Easting	Northing
B1	387150	5024431
B2	387150	5025008
B3	387642	5024946
B4	387667	5024574

Berth C		
Vertex	Easting	Northing
C1	388514	5024122
C2	388253	5024122
C3	387947	5024618
C4	388207	5024619

Berth D		
Vertex	Easting	Northing
D1	388311	5024572
D2	388750	5024504
D3	388750	5024122
D4	388574	5024122

Berth E		
Vertex	Easting	Northing
E1	387150	5024122
E2	387150	5024279
E3	387358	5024431
E4	387662	5024531
E5	387639	5024122

LEGEND

- Berth Vertices
- New Concept Berths: A, B, C, D, E
- Existing FORCE Device Berths & Export Cables
- Crown Lease Cable Corridor
- Crown Lease Deployment Area

Notes:

1) Plan showing the proposed new concept berth locations and shapes in relation to the existing berths and cables.

2) New concept berths digitized from drawing "CLA Berth Arrangement for 'First Principles' rev 3 pdf", received on August 15th, 2018.

Scale: 0 200 400 600 m
1:10,000

Datum / Projection: WGS84 UTM 20

Project: Fundy Tidal Energy Demonstration Project

Client: Fundy Ocean Resource Centre for Energy

Title: FORCE
NEW CONCEPT BERTHS

Job / Proposal #: 612 | Doc #: SGI-612-108-B

Prepared By:

SEAFORTH GEOSURVEYS
Seaforth Geosurveys Inc.
300 Prince Albert Road, Suite 200
Dartmouth, Nova Scotia
Canada B2Y 4J2
Phone: (902)468-3578
Fax: (902)468-6885

Rev	Date	Prepared By	Checked By	Comments
B	08/28/18	AA	GC	EDITS TO BERTH A/C
A	08/17/18	AA	GC	DRAFT FOR REVIEW

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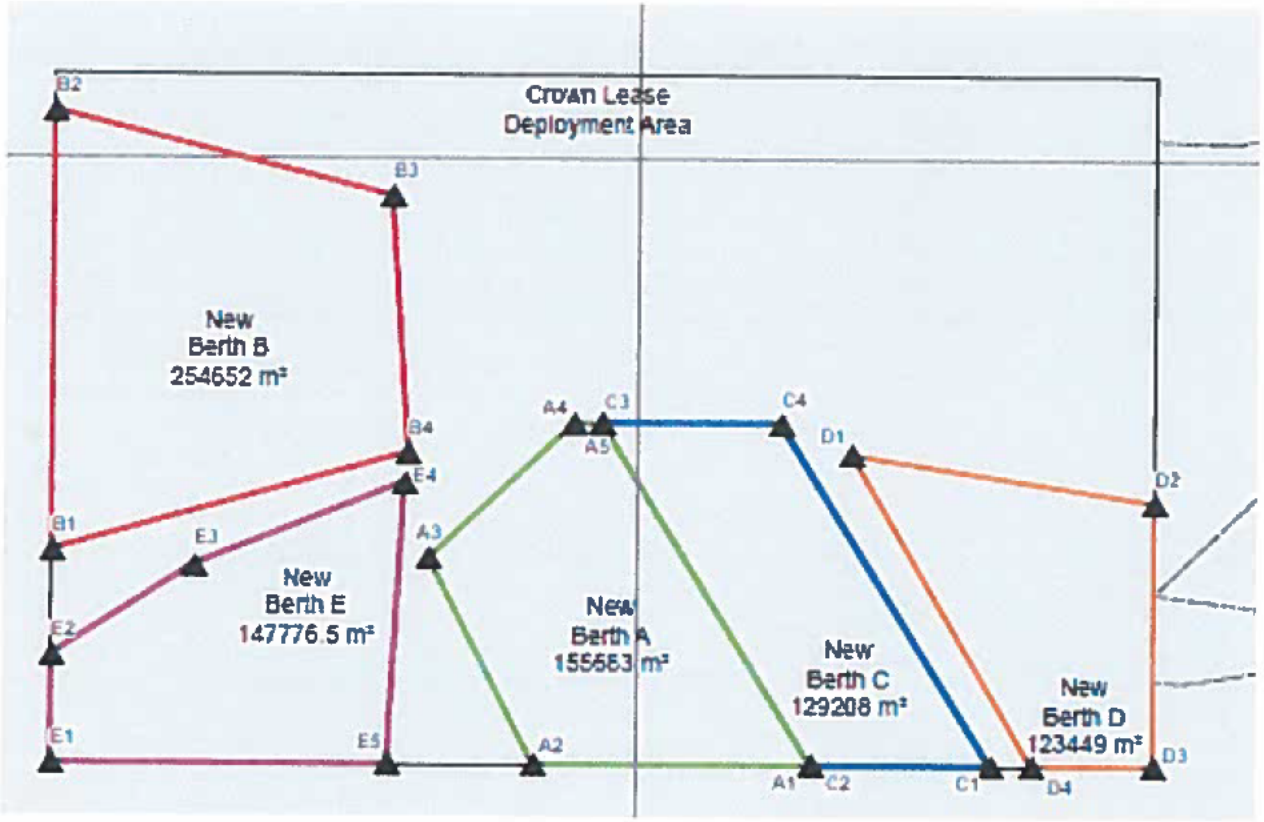
Crown Lease
Deployment Area
B2
B3
New
Berth B
254652 m²
B4
E4
B1
E3
E2
New
Berth E
147776.5 m²
E1
E5
A4
C3
C4
A5
D1
D2
A3
New
Berth A
155563 m²
New
Berth C
129208 m²
New
Berth D
123449 m²
A2
A1
C2
C1
D4
D3

NOVA SCOTIA

Schedule C – Project Plan

Attached

NOVA SCOTIA

Schedule D – Insurance Requirements

Commercial General Liability Insurance

Comprehensive General Liability Insurance for liabilities arising out of property damage, personal injury and bodily injury including death resulting from any activity connected with the existence, management, maintenance and operation of Sustainable Marine Energy Canada Ltd. tidal energy project at FORCE. All such policies shall name as Additional Insureds Nova Scotia, their successors and assigns, and their respective directors, officers and employees. This insurance will include the following provisions:

- policy limit of liability of $5 million per occurrence (can be structured as primary plus supplementary layers or primary plus Umbrella and/or Excess);
- annual aggregate limits permitted for Products Hazard & Completed Operations, Pollution coverage and Employee Benefits liability coverage; no other policy aggregates permitted;
- Products Hazard and Completed Operations, Pollution coverage subject to separate annual aggregate limits equal to the policy limit of liability;
- Sudden & Accidental Pollution coverage for all insured perils;
- nil deductible for Bodily Injury;
- maximum deductible all other occurrences of $100,000 per occurrence, except Sudden & Accidental Pollution ($1.0 million each claim);
- no hazardous operations exclusion permitted (i.e. excavation, pile driving, shoring, blasting, under-pinning or demolition);
- owners' and contractors' protective liability;
- blanket written and oral contractual liability;
- contingent employers' liability;
- personal injury liability;
- broad form occurrence property damage; and
- fire fighting expense liability.

Environmental Impairment Liability Insurance

Environmental Insurance insuring Sustainable Marine Energy Canada., all contractors, subcontractors, suppliers, and tradesmen while working on site, engineers, architects, consultants and subcontractors, Nova Scotia, their successors and assigns and their respective directors, officers, employees, agents and servants.

The insurance shall include the following provisions:

- policy limit of $5 million per occurrence (can be structured as Primary plus Supplementary, Layered or Primary plus Umbrella and/or Excess);
- Claims made form permitted;
- Extended reporting period of 24 months, as required;
- Minimum of 24 months completed operations coverage;
- Cross liability and separation of interest with respect to each Insured;
- Nova Scotia and their respective directors, officers and employees included as Additional Insureds;
- Breach of any of the terms or conditions of the policy, or any negligence or willful act or omission or false representation by an Insured or any other person, shall not invalidate the insurance with respect to Nova Scotia; and
- Primary insurance without right of contribution of any other insurance carried by Nova Scotia.

Marine - Hull & Machinery And P&I (Protection & Indemnity)

Insuring the machinery equipment vessels and other marine property of contractors and subcontractors not insured under any other water craft provisions found in the course of construction policies.

The insurance shall include the following provisions:

- policy limit of liability Hull & Machinery of $5 million per occurrence; and
- Protection & Indemnity (P&I) limit of liability as defined by Canadian Marine Underwriting Standards.

Documentation Required

The general insurance documentation to be produced by Sustainable Marine Energy Canada shall meet the following requirements. No other documentation is required. For general insurance purposes, Sustainable Marine Energy Canada may elect to have separate letters produced for the construction period and the operating phase or may combine these into one letter from one broker covering both the construction period and the operating phase.

- **General Insurance – Construction Period**

  For the general insurance program covering the construction period, Sustainable Marine Energy Canada must produce by at the latest four months prior to deployment a letter from its insurance broker appointed for the project, on the broker's letterhead, dated and signed by an authorized representative of the insurance broker, stating:

- that the broker has been appointed by Sustainable Marine Energy Canada as its insurance broker for the construction period of the Sustainable Marine Energy Canada tidal energy project;
- that the broker has examined the general insurance requirements included in this document, identified as the Insurance Requirements;
- the estimated total amount of the insurance premiums for the full construction period, including any coverage extension periods beyond completion of Sustainable Marine Energy Canada tidal energy project and confirming that all of the general insurance requirements set out in the Insurance Requirements have been included in this estimated cost;
- that in the opinion of the broker, the estimated total insurance premium cost is its best estimate as of the date of its letter;
- that in the opinion of the broker, that there is no known impediment as of the date of its letter to producing general insurance policies meeting all of the Insurance Requirements with coverage to take effect from the date of the signing of the Agreement.

If more than one insurance broker has been appointed by Sustainable Marine Energy Canada with each broker responsible for a portion of the construction period insurance program, each of the brokers shall produce a letter meeting the above requirements. Each of these letters shall clearly identify the elements of the construction period general insurance program that have been assigned to the respective brokers. Each broker's letter will deal solely with the elements of the construction period insurances that have been assigned to it.

- **General Insurance – Operating Phase**

For the general insurance program covering the operating phase, Sustainable Marine Energy Canada must produce a letter from its insurance broker appointed for the project, on the broker's letterhead, dated and signed by an authorized representative of the insurance broker, stating:

- that the broker has been appointed by Sustainable Marine Energy Canada as its insurance broker for the operating phase of the Sustainable Marine Energy Canada tidal energy project;
- that the broker has examined the general insurance requirements included in this document, identified as the Insurance Requirements;
- the estimated total amount of the insurance premiums for the first full year of the operating phase after completion of Sustainable Marine Energy Canada tidal

energy project, and confirming that all of the general insurance requirements set out in the Insurance Requirements have been included in this estimated cost;

- that in the opinion of the broker, the estimated total insurance premium cost is its best estimate as of the date of its letter;
- in the opinion of the broker, that there is no known impediment as of the date of its letter to producing general insurance policies meeting all of the Insurance Requirements with coverage to take effect from the date of the signing of the Agreement.

If more than one insurance broker has been appointed by Sustainable Marine Energy Canada, with each broker responsible for a part of the operating phase insurance program, each of the brokers shall clearly identify the elements of the operating phase insurance program that have been assigned to the respective brokers. Each broker's letter will deal solely with the elements of the operating phase insurances that have been assigned to it.

PROPOSED REVISIONS TO PROJECT PLAN

FUNDY OCEAN RESEARCH CENTRE FOR ENERGY (FORCE)

Submitted to:
Nova Scotia Department of Energy and Mines
Joseph Howe Building, 11th Floor
1690 Hollis Street
Halifax, Nova Scotia, B3J 3P7

Prepared by:
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26 March 2019

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Table of Contents

1.0 INTRODUCTION

Sustainable Marine Energy (Canada) Ltd. (SMEC) has previously proposed to amend its Project Plan for Berth B at the Fundy Ocean Research Centre for Energy (FORCE) to focus on the installation of an array of smaller, floating platforms rather than two 2.5MW TRITON devices. To accomplish this, SMEC selected the PLAT-I in-stream tidal energy device. PLAT-I is a floating platform equipped with 69.2kW SCHOTTEL Instream Turbines (SIT 250) - the same turbine technology that was to be installed on the TRITON platform.

SMEC and its partners are fully committed to the FORCE project and together intend to install PLAT-I tidal energy devices on a commercial basis with an aggressive project timeline to build out the approved capacity as regulatory approvals are realized. To accomplish this, project buildout will proceed in a low risk, incremental manner following extensive in-ocean proving of the PLAT-I technology in Nova Scotia. This will include the PLAT-I 4.63 (equipped with 4 turbines with 6.3m-diameter rotors) and the PLAT-I 6.40 (equipped with 6 turbines with 4.0m-diameter rotors). A detailed Front End Engineering Design (FEED) study for the FORCE project has been completed and project development activities are firmly underway including preparing permit applications and ongoing stakeholder engagement.

SMEC remains committed to developing and installing its project at the FORCE site in a timely manner. This document will focus on SMEC's commitment to construct and install three PLAT-I 6.40 platforms at FORCE with a combined capacity of 1.245MW by the end of 2020. The substantial work undertaken by SMEC in site characterization, geotechnical analysis, marine operations planning, interconnection agreement, environmental and fisheries approvals, building relationships in the local supply chain, and training of highly-qualified people means that much of the work is already significantly advanced or completed.

This document details the proposed changes to SMEC's Project Plan by providing the following:

- A clear description of the proposed project revisions including revised coordinates for SMEC's berth at FORCE and up to date berth layout
- The rationale for the proposed changes
- Overview of project team structure and responsibilities
- Project Plan including schedule and the milestones to meet the terms of the FIT agreement specific to construction that will take place prior to the end of 2020.

Through this project SMEC intends to continue its progressive development of small- and utility-scale floating instream energy conversion systems that can be installed, worldwide, in rivers and tidal currents to provide clean, renewable electricity for remote communities and utilities. The proposed project also includes the use of innovative rock anchoring technology that will be made commercially available to the wider tidal industry and other potential markets and will provide the growing local tidal sector in Canada and other jurisdictions with a new method of anchoring tidal platforms or vessels for installation of gravity

base foundations and marine operations. The technology also has a wide range of potential uses in other marine industries including aquaculture.

2.0 RATIONALE FOR PROJECT PLAN CHANGES

2.1 Background

In 2013, the positive environment created by the Province through the establishment of FORCE and the Feed-in Tariff system led SMEC to pursue a berth at the FORCE site as our preferred means of demonstrating our in-stream technologies, while at the same time building a Canadian company to pursue markets in North America. SMEC has since assembled a team of highly-qualified Nova Scotians to build the FORCE project and has established firm connections with Nova Scotian firms specialising in engineering services, scientific research, fabrication and marine operations.

NSDEM shared SMEC's vision and awarded Berth B to the company in March 2014. Since then, the Province has been an important partner to SMEC, providing clear information and assistance where possible. Over a three-year period the team worked diligently on engineering design and project development activities for the FORCE project utilising the TRITON technology. However, as a result of increasing technical risk and an uncertain investment climate, in early 2017, SMEC began a review of the project that included evaluation of options to obtain investment in the company, and to look at technology alternatives. The process advanced through a series of stage gates and led to a decision in September 2017 to set aside TRITON and re-focus SMEC efforts on a lower-cost, lower-risk technology solution that would allow a measured scale-up and deployment "proofing" approach.

2.2 Current Status

SMEC has selected the PLAT-I 6.40 as the technology of choice for its project at FORCE. The proposed technology is described in detail in **Section 4.0**. The key material change in the project is the type of platform that will be used. Each PLAT-I 6.40 will be equipped with six SIT 250 turbines, the same turbines that were planned for TRITON platform, and the related Turbine Control System. An additional change is the proposed scheduling of the project which is shifted into 2020 due to the ongoing demonstration of the PLAT-I technology and supporting Balance of Plant in Grand Passage, Nova Scotia.

The main implications of these changes are:

- SMEC will be using a proven platform solution: deployed in both Scotland and Nova Scotia with step change technical advances in each phase of the project.
- PLAT-I units will be tethered to the seabed using a proven rock-anchoring system with industry-wide application
- The PLAT-I technology will require a larger overall sea area but can be accommodated within the proposed berth realignment at the FORCE site
- Known and manageable costs for all aspects of the proposed project – backed up by in-ocean deployment and operational experience at Grand Passage, NS
- Facilitates the use of smaller, more readily available and cost-effective vessels for installation.

Extended testing of both PLAT-I 4.63 and PLAT-I 6.40 will result in a delay to the FORCE project beyond the project plan presented previously. However, SMEC has determined that this additional testing is of vital importance and that the buildout of the FORCE project is contingent upon and cannot proceed without successful testing at Grand Passage. SMEC believes that strategy will also significantly de-risk the overall FORCE project and, crucially, will enable access to debt finance on commercial terms and allow SMEC to provide contracts with suitable commercial terms and conditions for other project developers.

Following on from the array deployment at Grand Passage, three PLAT-I 6.40 units will be fabricated and deployed at FORCE in late 2020. Further information on this is presented in **Section 5.0.**

The SMEC team is dedicated to the continued development of viable marine renewable energy technology and helping Nova Scotia realize the economic benefits of this industry, while making a significant contribution to the fight against climate change. The balance of this document provides details of the project team, the proposed technology and the plan for the project.

While we have defined the project as clearly as we are able, some uncertainties remain. SMEC has developed options to accommodate various potential outcomes and presented them in **Section 6.0**.

3.0 PROJECT TEAM

Sustainable Marine Energy (Canada) Ltd. (formerly Black Rock Tidal Power Inc.) is a subsidiary of Sustainable Marine Energy Ltd. (see corporate structure, below). SME, BRTP and SCHOTTEL Hydro's tidal energy businesses were merged on January 1, 2019. This established team has a proven track record of collaboration and technology development that minimizes delivery risk associated with the project. The structure for the project team is shown below.

The business restructuring process has created a strong project team that brings a wealth of relevant and specific experience of designing and constructing tidal energy systems and are uniquely equipped to carry out the proposed project. The following sections provide a brief overview of each company, and biographies of key team members.

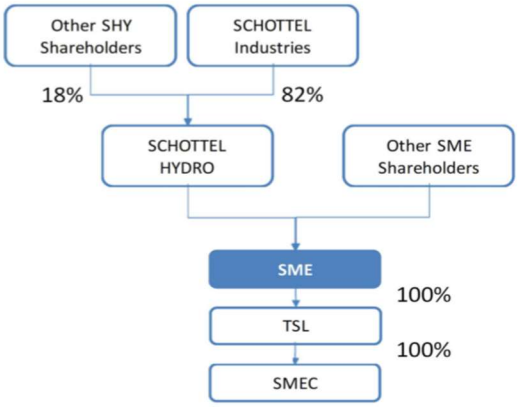


Figure 1: Project Team Structure

3.1 Sustainable Marine Energy (Canada) Ltd.

SMEC employs a highly-skilled team of professionals with extensive and relevant experience. A particular strength of the team lies in the relationships developed with close to 100 suppliers and contractors during the development of the project, including design engineering firms, simulation companies, marine operations and fabricators.

SMEC has conducted stakeholder engagement activities including open houses and has ongoing interactions with the indigenous community. SMEC has in-house expertise regarding regulatory requirements. The team is knowledgeable in investor research and has demonstrated success in obtaining government funding.

Jason Hayman
Managing Director

Jason is a Naval Architect with an MPhil in Sustainable Development from Cambridge University. He has expertise in the design of marine equipment that operates in high flow environments. Jason has been involved in the design, build and refit of numerous vessels from small rescue craft to high-performance composite racing yachts, ferries, offshore construction vessels and FPSOs. As founder and MD of SME, Jason has successfully led the development of PLAT-O, PLAT-I and the RAPTOR rock anchoring technology. Following the merger and restructuring between SCHOTTEL Hydro, SMEC and SME Jason is responsible for overall management and leadership of the group of companies.

Tanya Harrietha
VP Business Operations

Tanya is responsible for the business management of SMEC. With over 18 years of senior leadership experience, she has spent the majority of her career working in growth oriented and start up environments. Prior to joining SMEC in 2016, Tanya held several strategic VP Finance & Operations roles implementing effective risk management and planning organization's financial strategy. These roles have provided her with extensive operational, international, treasury, deal analysis, negotiations and investor relations experience. She is a Chartered Professional Accountant (CPA, CMA) and a Saint Mary's University accounting graduate. She is also actively involved in the community and is a current Board Member of Family SOS and Board Member and Treasurer of Alice House.

Mark Savory
VP Project Delivery & Commercial

With over 35 years of engineering, construction, project management, contract negotiation, operations and maintenance management and executive management in energy and infrastructure projects, Mark is well suited to provide the leadership in project delivery and commercial aspects of SMEC's business objectives. Mark has been involved in the marine renewable energy sector since 2008 with extensive experience with various tidal technologies.

Angela MacPhail
Office Manager

Angela is Office Manager at SMEC. Prior to working at SMEC, Angela graduated in 2008 with a Bachelor of Science Degree, Major in Psychology from Mount Saint Vincent University and worked as a Personal Support Worker (PSW) with Gateway

Homes Inc. until 2016. Angela's role at SMEC for the past three years has been to ensure daily operations run smoothly by use of her strong organizational skills and to provide general office support for staff and clients. Her main responsibilities include document management, invoicing and accounts, meeting minutes, general IT support, logistics support and assistant to the VP of Business Operations.

Craig Chandler
Compliance Manager

With over 20 years of technical and project management experience, Craig has delivered over 200 projects in renewable energy, ocean technology, environmental management and strategic advice. Craig has a passion for marine renewable energy, both in terms of the technology and the opportunities it holds for environmental and economic benefits to Nova Scotia and other parts of the world. With a deep understanding of the challenges involved in developing new technologies for the marine environment, including regulatory and contractual issues, Craig works to develop practical solutions that maximize resources and minimize risk.

Jason Clarkson
Operations Manager

Jason is responsible for the operational delivery of projects, building and managing the operational delivery team and the implementation of Health and Safety Execution and quality assured policies and procedures. Jason has over 16 years of experience as a health and safety professional, providing extensive professional experience working cross-functionally and with multiple disciplines and sectors. Jason has worked as a project consultant in various industries including mining, oil and gas, marine and tidal energy. He is a Canadian Registered Safety Professional and holds an Advanced Diploma in Occupational Health and Safety from University of New Brunswick.

3.2 SCHOTTEL Hydro

SCHOTTEL HYDRO (SHY) is a leader in the development of in-stream energy technology. SHY develops, constructs and sells SCHOTTEL Instream Turbines, providing high quality system engineering and manufacturing. SHY stays close to its products for a device's lifetime providing service and its after-sale network guarantees customer proximity worldwide. SHY headquarters are located in Spay, Germany.

Ralf Starzmann
VP Business Development & Head of Power Take-off Systems

Ralf graduated as a mechanical engineer from the University of Stuttgart in Germany, in 2007. Until 2008 he worked with VOITH Hydro in their ocean energy department on wave and tidal energy devices. In 2008 he started as a Ph.D. student at the University of Siegen in Germany specializing on the aero-acoustic analysis of the Wells turbine for ocean wave energy conversion. After completing his Ph.D. in 2012, he joined SCHOTTEL working on tidal energy related issues. This involves both, the hydrodynamic design of the SIT turbine as well as the TidalStream TRITON platform. Since 2015 Ralf has been the Sales Director and Head of Hydrodynamics of SCHOTTEL HYDRO and most recently the VP Business Development & Head of Power Take-off Systems. Ralf is also a member of the German mirror committee for IEC TC 114.

3.3 Sustainable Marine Energy

Sustainable Marine Energy (SME) is a developer of technical solutions for use in energetic marine environments, which includes integrated, turnkey tidal energy systems and a range of innovative anchoring and mooring products. SME is 100% focused on providing an integrated solution that leads to a step-change reduction in the cost of marine and river current energy with the goal to enable access to power in remote island, coastal and river communities, many of which have high costs of energy and abundant local resources.

SME has delivered, and will continue to deliver, technology that challenges the rest of the tidal energy industry on price and performance. Based in Edinburgh, Scotland, SME has access to a wealth of maritime knowledge from an area steeped in marine innovation and history. In addition to innovative tidal energy solutions, SME has also developed a dedicated rock anchoring system that provides cost effective anchoring solutions for tidal energy projects, as well as for other marine applications.

SCHOTTEL HYDRO and SME have been working collaboratively for more than four years on the development of a joint commercial product offering including the fully integrated PLAT-I system. The technology proposed for this project in the Bay of Fundy has been jointly delivered and previously demonstrated by this team.

The SME team includes staff with PhD qualifications in Hydrodynamics, Engineering and Naval Architecture, assisted by a well-resourced support team with expertise in Marine Operations, HSE, Onshore Operations, Facilities and Purchasing. The team at SME has a broad wealth of knowledge within the marine renewable sector with technical direction coming from the Managing Director and Board who collectively have many years' experience within the marine industry.

David Stoddard-Scott Strategic Projects Manager	An enterprising marine scientist with hands-on experience in start-ups, business strategy, and technology development, David has proven organisational skills and is able to use practical problem solving to achieve project objectives on time and to budget. Hard-earned experience in both marine operations and commercial strategy means David gives full commitment to producing excellent results in a wide variety of working environments. David previously worked to commercialise Seatricity UK Ltd's Oceanus 2 wave energy device which was the first device to be installed at Wave Hub, 10km north of St Ives Cornwall.
Chris Burden Principal Naval Architect	Prior to joining SME, Chris spent six years in the defence sector working on submarines and surface combatants. Chris' focus at SME over the last three years has been to lead on all elements of the design and structural development of PLAT-O and PLAT-I. Chris has successfully delivered a fully costed, manufactured and tested PLAT-I platform. Coming from a marine background including operating subsea tidal platforms, the knowledge that Chris brings to any tidal project is invaluable.

Penny Jeffcoate
Hydrodynamic Engineer Head of Research

Penny has a PhD in tidal barrage engineering and completed a postdoctoral research position in tidal energy and leads our team during tank testing, site evaluation and performance assessment. During her PostDoc, Penny managed the testing of both an internal tidal energy platform and the STG SCHOTTEL Instream turbine at Strangford Lough, working with a wide selection of international clients and partners. For the 3.5 years at SME she works with the design and modelling team, and manages on site assessments and performance measurements to prove the engineering design and system performance of SME's products. She also coordinates and manages the in-house and collaborative research projects that SME has with world-leading universities and research institutions, investigating both engineering systems behaviour in the tidal energy sector as well as environmental interactions and impacts.

Candice Russell
Supply Chain Manager

Candice is an accomplished procurement, production manager and administration professional with twenty years' experience in high profile marine companies, delivering tidal energy systems, high performance powerboats, and super yachts. As one of the founding team members of SME, Candice has been involved in all elements of procurement and production of both the PLAT-O and PLAT-I systems with a keen eye for detail and quality control whilst maintaining stringent management on costs.

Nick Cresswell
Lead Design Engineer

Nick is Mechanical Design Engineer and a PhD in the Hydrodynamics of Tidal Stream Energy with extensive research and industrial experience in tidal stream energy. He has a background in academic engineering research into device hydrodynamics and applied mechanical systems design for tidal stream energy. Prior to joining SME, he was a PhD Researcher at Durham University. Nick's primary responsibilities at SME include supporting the Principal Naval Architect with specification, design and engineering of tidal energy systems. As well as, providing technical support and/or back-up to the project and/or site team. Nick prepares, stores and maintains engineering computational models, documents and drawings.

Joe Lee
Lead Electrical Engineer

Joe is a dedicated multi-disciplinary engineer, with a proven track record of delivering mechanical and electrical engineering solutions. He holds certificates in Electro-technical Installation from the Isle of Wright College and HNC in Marine Engineering from City of Glasgow College. Joe's role at SME is to provide specification, design and delivery of all ancillary and balance of plant (ex. Power conversion system), electrical, control and instrumentation systems. He also provides technical support and/or back-up to the project and/or site team. Joe also reviews the power conversion electrical and control systems specifications and engineering outputs and preforms quality analysis of deliverables from electrical and control engineering service providers.

3.4 Project Management Team

SMEC will lead all aspects of the project and be the primary point of contact with NSDEM and all regulatory bodies. SMEC and its contractors SMEC will work closely with the SME (UK based) engineering team and SCHOTTEL team to deliver the technical aspects of the platform, power take-off, mooring and balance of plant project elements and will provide project management services to supply, deploy and commission each phase of the proposed project. The organizational structure of the team is presented below.

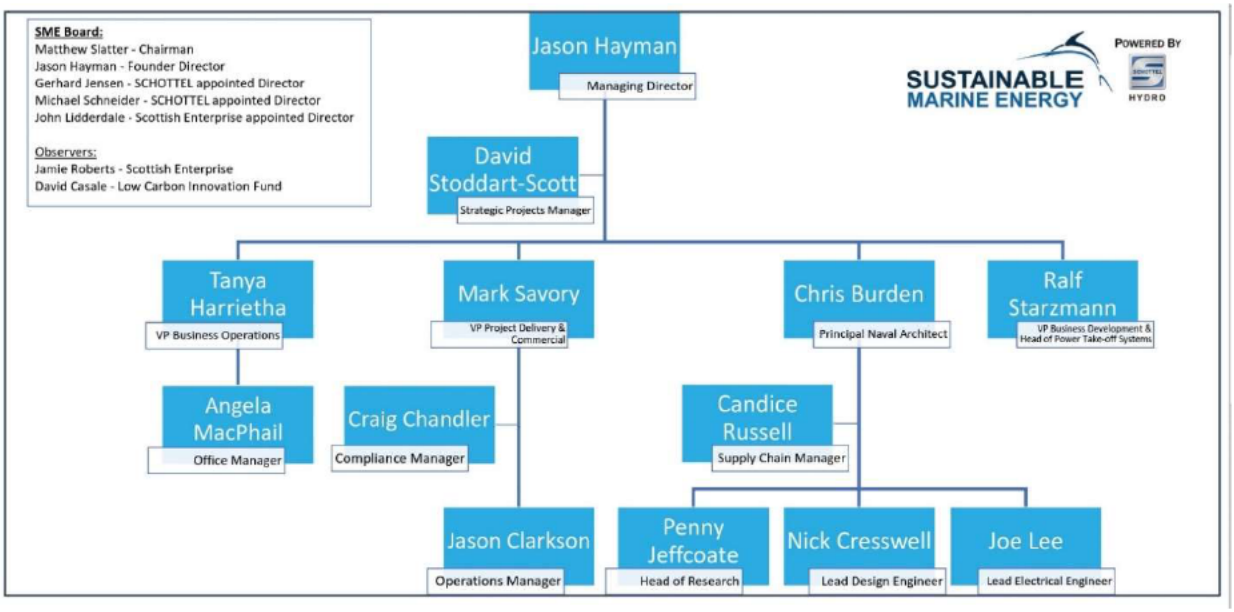


Figure 2: FORCE 1 Organizational Chart

4.0 PROJECT DESCRIPTION

4.1 Location

The proposed project will be installed at SMEC's berth at the FORCE site. The site coordinates as shown in the table below. Section 4.4 provides detail on the berth layout at FORCE.

Vertex	Easting	*Northing*
C1	388514	5024122
C2	388253	5024122
C3	387947	5024618
C4	388207	5024619

4.2 Previous Deployments

The SMEC FORCE project will entail a number of major innovations and 'industry firsts' however, the major technology components of the proposed project will have been previously proven in a number of locations around the world.

The SIT 250 turbine has undergone extensive laboratory testing, field trials, and operational deployments to prove its functionality and efficiency:

- Full-scale tests in Strangford Narrows, Northern Ireland were carried out in 2014 for 260 operating hours according to the International Electrotechnical Commission's (IEC) latest standards. The work was part of the MaRINET testing campaign at the Queens University Belfast tidal test site in Portaferry, Northern Ireland.
- Two turbines were deployed on SME's PLAT-O platform in the Solent, Isle of Wight in 2015.
- A single turbine was installed in 2016 and generated renewable electricity for a sustainable forestry facility in West Papua, Indonesia until late 2017.
- Four SIT 250 turbines were installed in 2017 on SME's PLAT-I platform at SME's test site near Connel, Scotland.
- Two turbines are currently installed on SME's PLAT-I in Grand Passage, Nova Scotia.

The following sections provide details of the first full-scale deployment of the PLAT-I which commenced in late 2017 in Scotland, the ongoing PLAT-I Grand Passage deployment and summarizes previous deployments of the SIT turbine (and its predecessor, the STG).

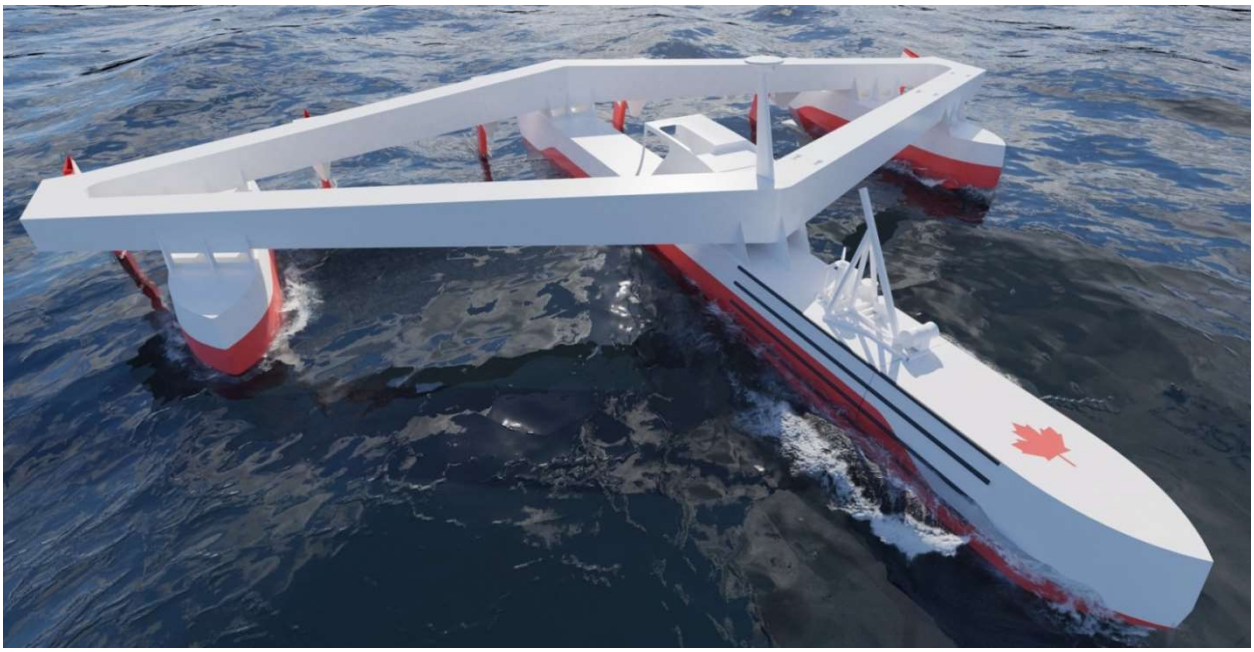
Operational results from the Connel installation met the high expectations of the project team. The figures below show sample test results from the deployment including (from left to right): i) power curve validation with a high degree of correlation between the 10-minute average of turbine power performance and the predicted power output ii) platform 'excursion' remaining well within predefined limits iii) mooring line loadings in line with predictions.

Figure 3: Selected Connel Test Results

4.3 Technology to be Deployed at FORCE

The proposed project will incorporate many elements and learning from SMEC's work to date, including a number of important new innovative elements, the centrepiece being the PLAT-I floating turbine platform. The PLAT-I floating tidal energy platform is designed to be installed, maintained and decommissioned utilizing modest, readily available work vessels. From an operational point of view, it is optimized for sites with low to moderate wave exposure such as FORCE, with its robust construction moored via a turret configuration allowing it to passively weather-vane with the tide.

The FORCE project will be comprised of second generation PLAT-I 6.40, which has a generating capacity of 415kW and is 30m long with a beam (width) of 27m. Like the PLAT-I 4.63 device currently deployed at Grand Passage, the PLAT-I 6.40 pivots on a turret connected to a two-point catenary mooring spread and passively aligns with the natural flow of the tidal currents. The trimaran design of the platform has been designed to provide low resistance and enhanced stability, as well as full accessibility to the turbines. The structure, largely constructed from high tensile steel, is a fully modular design to allow for worldwide shipping and ease of assembly at site. Each hull unit is based on a standard ISO 40ft container and joined together either on dry land or while afloat.



The PLAT-I 6.40 will be equipped with six (6) SIT250 turbines with 4m diameter rotors. Swing-up SIT Deployment Modules (SDMs) will allow maintenance to the SITs at the water surface for inspection and maintenance. Overload relief allows the turbines to kick-up to reduce loading on the platform and mooring spread in extreme conditions. The same kick-up system allows for trapped debris to be cleared and for protection of the turbines against ice impact.

The electrical power produced by the individual turbines will be conditioned onboard in the mid-section of the centre hull. An onboard transformer steps up the voltage before it is exported off the platform via the dynamic export cable running through the centre of the turret to the sea bed. A simple slip ring on top of the turret will allow electrical and fibre optic cables to pass from PLAT-I to the export cable, preventing twisting of the export cable as the platform turns with each ebb and flood tide. Technical specifications of PLAT-I 6.40 devices are provided in the following table.

	System Parameter	*Unit*
Redacted		

4.4 FORCE Berth Layout

Figure 6 shows the current layout of berths and proposed projects at FORCE. The extent of the area allocated to SMEC (indicated as "BRTP") is now known but the final location of platforms for each construction stage of the project is subject to ongoing detailed planning and consultation with FORCE and the berth holders.

The final array design will seek to maximize power output without comprising navigation of vessels around devices and impacting on the maintainability of the site - for example to ensure access is available to repair a subsea cable. Site bathymetry and geology are key design drivers. Anchors will be installed on the rock outcrops to avoid unstable cobble areas. Cables will be routed in cable corridors to ensure ease of

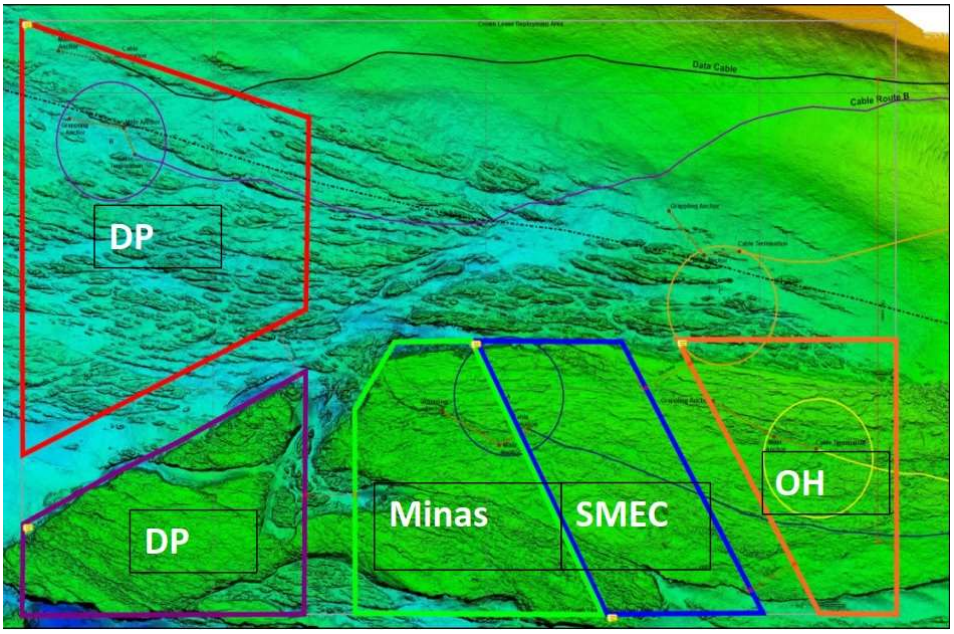


Figure 4: FORCE Berth Reallocation

access and maintenance. Use will made of naturally occurring gullies for the cable corridors where possible.

4.5 Anchoring and Mooring System

Each platform is intended to be anchored to the seabed with 2 x Raptor rock anchors which are mechanically secured into the seabed at pre-determined positions using a subsea drill rig called the AROV (Anchoring Remotely Operated Vehicle). The equipment was designed and built especially for these operations by SME and has been used on a number of marine anchoring operations, most recently in Connel, Scotland where 4 x Raptor 420 anchors were installed for SME's PLAT-I platform in extremely hard basalt and andesite rock.

This anchoring technology has many other potential applications and will be useful to other tidal energy developers, as well as other marine industries such as aquaculture and offshore wind turbines. The specifications of the Raptor rock anchoring system are provided in the following table.

The anchor installation system is designed to fit on the deck of a small multicat vessel (sourced locally where practicable, multicats from 23-27m LOA have been utilised thus far) with sufficient space and lifting capabilities for handling the AROV and associated equipment (main crane approx. 10t @ 12m reach).

Figure 5: SME's Anchoring ROV

The current AROV is powered from a diesel driven hydraulic power unit situated on the deck of the vessel. The system uses environmentally friendly bio-degradable plant based hydraulic oil. Anchors are mechanically secured to the seabed via a low-impact and low noise rotary drilling operation. All drilling operations are carried out and controlled remotely from a control cabin on the deck which is equipped with a video monitoring system, a data acquisition and logging system. The AROV is powered and controlled via a simple and robust umbilical which consists of the various pressure tested hydraulic hoses along with the control and camera cables. SME are also developing a new, more powerful AROV. This will be required to install the anchors in the existing BRTP Berth B given the complex bathymetry and higher water depth.

The mooring system is catenary mooring system attached to the anchors using shackles. SME's previous deployments a multicat vessel supported by a dive team has been the most cost-effective way of installing the mooring system. SME is currently developing a remotely operated tool to eliminate the need for divers when connecting mooring chains in deeper water.

Following the installation of the anchors the mooring chains are laid on the seabed ready for recovery. Both the forward and aft mooring chains are marked with small buoys that can be quickly and easily recovered to a vessel during connection of PLAT-I.

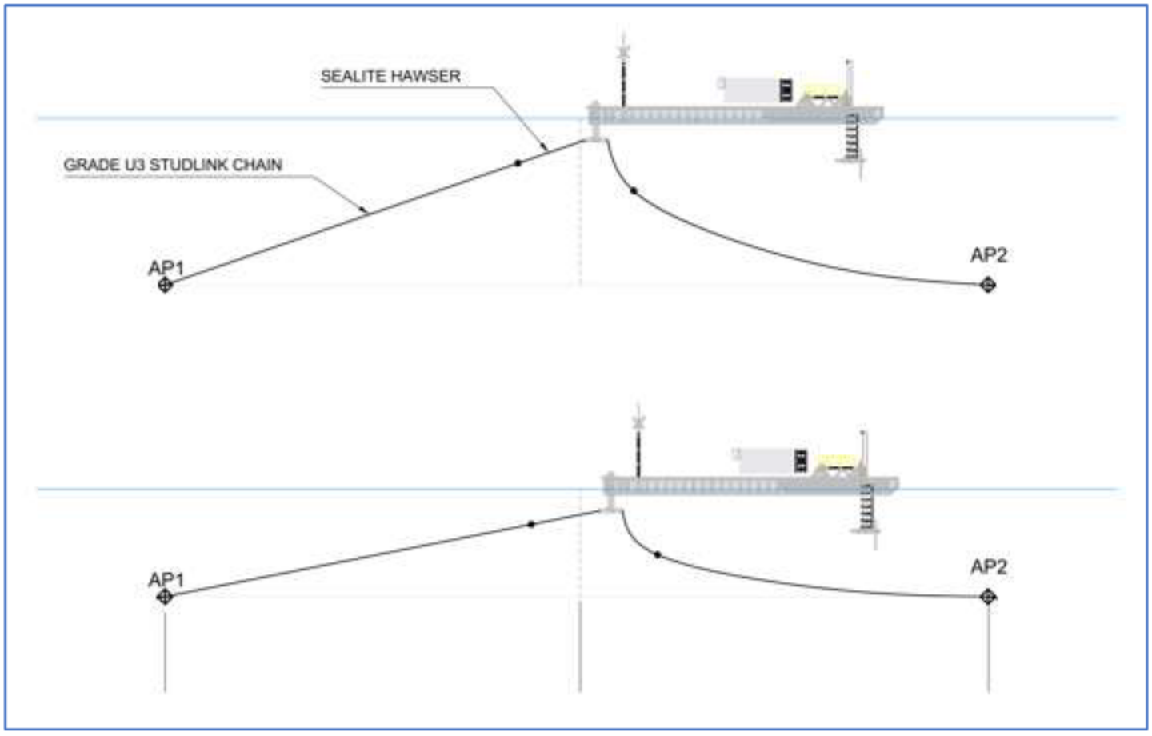


Figure 6: PLAT-I Anchor and Mooring System Arrangement

4.6 Installation

The PLAT-I installation process is a simple, efficient and low-cost process. This section describes that process as it was applied in Connel, Scotland in late 2017. The operation will be adapted for the particular conditions of the selected deployment sites at FORCE.

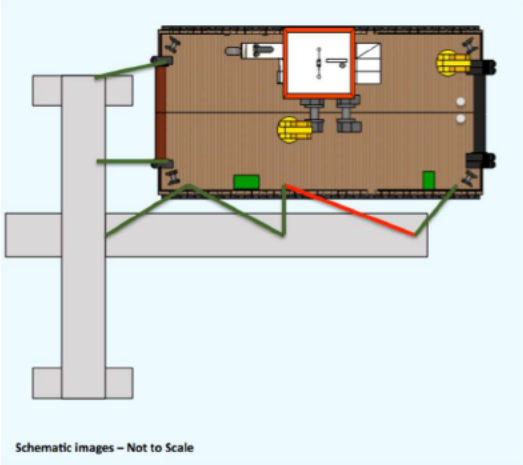
First PLAT-I is towed into position. The forward mooring is recovered to the surface using the crane of the vessel and line is connected to the forward hawser on PLAT-I using a shackle. The aft mooring is recovered to the surface and the line is pulled up through the turret and secured. A clacker plate in the turret safely locks the aft mooring chain in position.

Please note the figures below show a four-point mooring system rather than the two-point mooring system being proposed at FORCE.

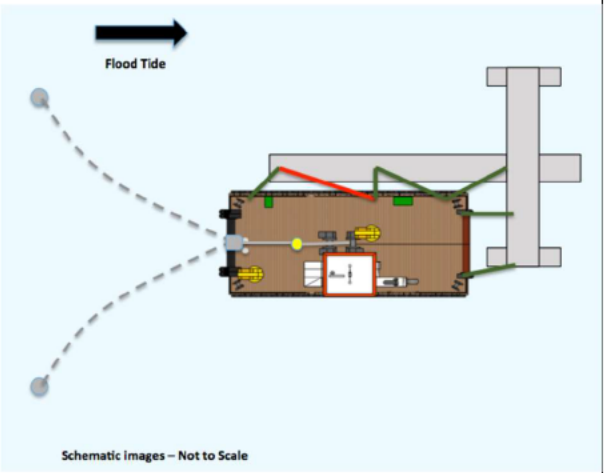
The PLAT-I Mooring connection operation has been separated into the follow sections:

Task 1 - Hip up alongside PLAT-I and tow to site
Task 2 - Pick up Variable length bridle, connect synthetic hawser & turret chain
Task 3 - Pick up Fixed length bridle and connect to PLAT-I
Task 4 - Pick up Variable length bridle and connect to PLAT-I
Task 5 - Disconnect Installation Vessel from PLAT-I and depart site

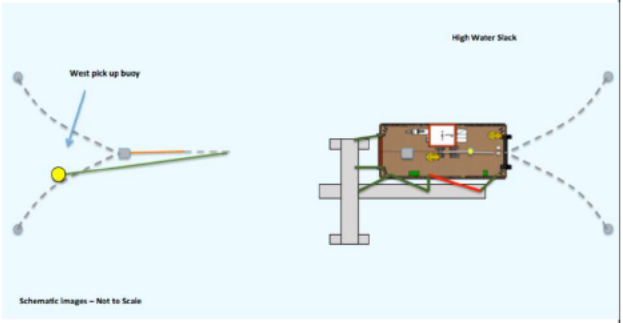
Task 1



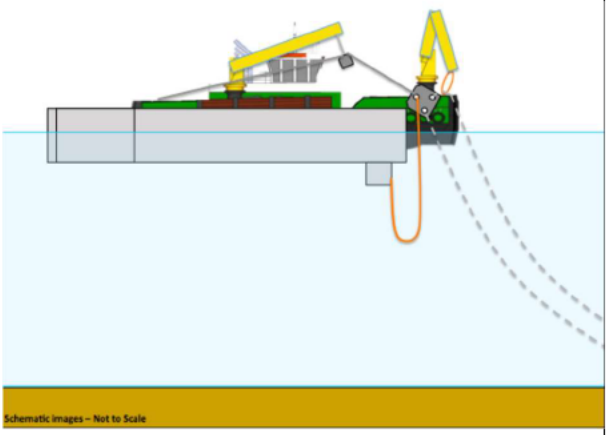
Task 2



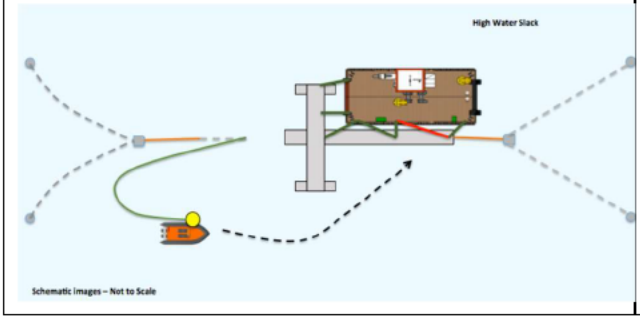
Task 3



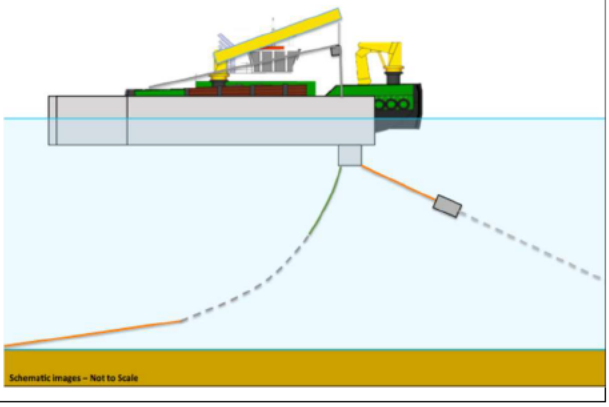
Task 4



Task 5



Completion



4.7 Environmental Effects Monitoring Program

PLAT-I's interaction with the environment is one of the critical aspects of the system's performance, making the EEMP a fundamental part of SMEC's project. An Environmental Effects Monitoring Program (EEMP) is being developed currently to ensure that data of a sufficient quantity and quality is collected to evaluate the potential impacts on marine life in the vicinity of the device, and report results to the regulator, indigenous groups, fishers, the public and other stakeholders in a timely manner.

As described previously, the PLAT-I 4.63 device has been reinstalled at a site in Grand Passage on a temporary, non-grid-connected basis but with the turbines in full operation. This deployment is providing SMEC and its partners with the opportunity to prove the technical capabilities of the system in Canadian conditions as well as testing the environmental monitoring equipment and techniques, as well as the overall EEMP process. This deployment will provide a vital learning which will de-risk the overall FORCE project from a number of vantage points.

The Grand Passage EEMP will inform FORCE's EEMP by collecting monitoring information at the SMEC test site (the "near field") and collecting data relating to noise and the presence of, and effects on, fish, seabirds and marine mammals in the vicinity of the PLAT-I. The ways that the information will be used are summarized below.

- SMEC will use the information to make decisions about the design of future tidal devices, about where and how to build future projects, and what improvements to make to future versions of the EEMP.
- Indigenous groups, regulators, fishers, the public and other stakeholders will use the information to aid in giving opinion on, and making decisions about, the SMEC project as well as other projects at FORCE and in the waters of Nova Scotia.

Given that the PLAT-I is a floating platform and sensors can be easily accessed for maintenance provides great advantages in the context of an adaptive management approach:

- Monitoring stations on PLAT-I can be accessed to allow the equipment to be maintained, repaired, upgraded or even replaced with new or different instruments. Changes can be proposed by SMEC or requested by the regulator but would always be subject to regulatory acceptance.
- Individual sensors can be moved from one monitoring station to another, allowing sensor performance to be assessed under different environmental conditions, and data to be collected from different locations.
- Third parties such as universities may wish to use PLAT-I as deployment platform for monitoring technologies and data collection.

4.8 Operation and Maintenance

The PLAT-I platform and the SCHOTTEL Instream Turbines (SITs) are designed to be low maintenance requiring only minimal servicing on an annual basis. The SIT Deployment Modules (SDMs) are designed to be rotated and pinned in the maintenance position to allow access to the turbine using a small vessel. The SDMs are easily removable to enable them to be taken ashore to a workshop for the 5 annual planned inspections and to carry out any unscheduled repairs.

The platform hull and structures will be inspected and cleaned annually in keeping with traditional marine hulls and structures, with paint repairs and replacement of sacrificial anodes carried out as required. Diver surveys will be carried out periodically to ensure the integrity and condition of the moorings and anchors. It is intended that skilled local tradesmen and engineers will be recruited and trained to form the service teams and carry out the planned maintenance of the PLAT-I platform, turbines and electrical systems. A stock of appropriate spare parts and consumables will be maintained close to the site and will be available to the service teams.

Typically the turbine and control system service requirements are as shown in the tables below:

Turbine Service Intervals
Service level Frequency Tasks

Period	Maintenance Type	Effort
12 months	Regular inspection at site	Submerged components: • Cleaning with steam cleaner • Inspect corrosion protection • Optical inspection of all turbines, blades, etc. Check lube oil level, magnetic plugs, take samples
5 years	Overhaul	• Workshop inspection and exchange of worn parts. Examples: Bearings, dynamic and static sealing, liner. • New lube oil filling • Test run after reassembly • Refurbishment of corrosion protection system

Electrical System Service Intervals
Service level Frequency Tasks

Period	Maintenance Type	Effort
Continuous	Automatic condition monitoring system	• Automatic data recording • Frequent reports • Alarm if defined threshold values are exceeded
6 Months	Regular inspection at site	• Check ventilation system / changing ventilator mats • Inspect critical electronics installations • Inspection of corrosion • Optical inspection
5 Years	Major inspection	• Inverter inspection and maintenance

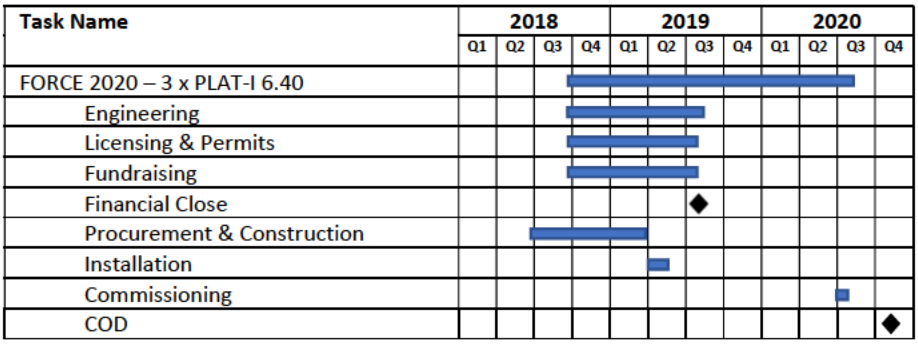
5.0 PROJECT PLAN

SMEC has developed a baseline project plan, schedule and milestones to deploy 3 PLAT-I 6.40 platforms at FORCE as described below.

5.1 Baseline Project Plan

Three PLAT-I platforms with a combined capacity of 1.245MW

This construction stage targets the deployment of three PLAT-I 6.40 platforms in 2020 using six SIT 250 turbines with the platform nameplate capacity of 415kW each. The baseline schedule for construction is shown below.



Baseline Milestones

The project milestones and associated timelines are presented below.

Activity	Generator 1 FIT-B-001
Selection and Approval of Berth License Area	Complete
PLAT-I Engineering Complete	October 30, 2019
Obtain Fisheries Act Authorization	September 30, 2019
Financial Close SPV	September 30, 2019
Start Fabrication	November 4, 2019
Procurement and Fabrication Complete	May 6, 2020
Marine Operations begin	April 6, 2020
Anchors and mooring systems complete	May 29, 2020
Deployment of devices complete	June 30, 2020
Commissioning of devices	July 30, 2020
Commercial Operation of all generating facilities	October 31, 2020
Commercial Operation Date	November 30, 2020

5.2 Development and Project Costs

Budgeted costs for SMEC activities are presented below. These costs include ongoing project and technology development costs for FORCE, design and build of an additional three PLAT-I 6.40 units, installation and commissioning of platforms and balance of plant at FORCE and pro rata overheads for 2019 and 2020.

Budgeted Project Costs	Redacted
Development & Permitting Costs	
Engineering, Technical Development & Demonstration (PLAT-I 4.63 and PLAT-I 6.40)	
Platform Costs	
Installation & Commissioning Costs incl. AROV	
Total Project Costs	

The following table presents the major work components associated with the project, and the anticipated geographical location in which the work will be completed. SMEC is committed to having as much of the work performed in Nova Scotia as practical. This corporate commitment has been demonstrated through procurement activities for the TRITON, which saw $12M in TRITON related expenditures incurred in Nova Scotia, and will continue should the proposed project be approved.

Project Component	Location of Work	Nova Scotia Capacity Building
Project Development	Nova Scotia / UK / Germany	Training of HQP and local content
Fabrication of Platform	Nova Scotia / UK / Southeast Asia	Maximise local content
Systems Integration and Assembly	Nova Scotia	Training of HQP and local content
Balance of Plant - Design and Procurement	Nova Scotia / UK	Training of HQP and local content
Marine Operations	Nova Scotia	Introduction of new vessels such as Multicat and training of HQP and local content
Anchoring system design	United Kingdom	Technology access to other developers and industries
Anchor installation	Nova Scotia	Technology access to other developer and industries
Commissioning	Nova Scotia	Training of HQP and local content
Operations and Maintenance	Nova Scotia	Training of HQP and local content

6.0 RISK MANAGEMENT

SMEC has identified the following risks to the project plan and has developed mitigation strategies to limit the impact of these risks.

Description	Type	Risk Level	Mitigation
Timeline challenges with receiving approval under the Fisheries Act for 2018 / 2019 demonstration	Regulatory	High	SMEC initiated the permitting process with DFO at an early stage. Approval to install platform awarded in advance of install. Approval to operate turbines expected imminently. Extensive EEMP and research activities to address uncertainties.
Site permission for deployment	Regulatory	Moderate	Continuing engagement with FORCE, other berth holders and stakeholders. Grand Passage deployments will support and de-risk.
Obtaining sufficient capital	Financial	Low	Required funding is lower than multi-megawatt projects due to lower risk associated with stepwise approach. Proposed device is high TRL (7).
PLAT-I design is not appropriate for Bay of Fundy environment	Technical	Low	Detailed PLAT-I 6.40 design process using operational data from PLAT-I 4.63 deployments and environmental and load data for Bay of Fundy provided by BRTP.
Installation of rock anchors presents technical challenges	Technical	Moderate	SMEC has initiated the engineering of the AROV to operate in deeper water. SMEC has contracted qualified geoscientists to assess the type and quality of the bedrock. Installation plan will include contingencies for a variety of potential challenges.
Delays in Marine Operations due to Environmental Conditions and Tides	Technical	Low	Schedule operations during neap tides and monitor weather with assistance of 3rd party where necessary.
Risk that no suitable vessel for the installation is available	Technical	Moderate	Develop new methodologies using local vessels or bring vessel in from abroad.
Lack of future market clarity to attract investment for latter project construction stages	Market	Moderate	Maintain communication with regulators and stakeholders and demonstrate viable technology

APPENDIX A

PLAT-I 6.40 - General Arrangement

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