



Tough Bhoi.

INDUSTRY SPEC SHEET • 14 PAGES

A mobile battery energy storage system engineered for the harshest defence, Arctic, and remote-energy operating envelopes — available in two ISO form factors: 520 kWh / 270 kW (10-ft, 2 × 135 kW units) and 1,040 kWh / 540 kW (20-ft, 4 × 135 kW units). Paired with hardware-grade quantum random number generation for true sovereign control of the energy layer.

CAPACITY 520 / 1,040 kWh	POWER 270 / 540 kW	ENVELOPE -50 °C	CHEMISTRY LFP
LATITUDE 60° N+	COLD SOAK -50 °C	WIND ≥ 100 km/h	FORM ISO 10 / 20-ft

01 · EXECUTIVE SUMMARY

Powering mission readiness at the edge.

Tough Bhoy is a fully-integrated, mobile battery energy storage system (BESS) purpose-built for defence, Arctic, mining, and critical-infrastructure operations where commercial-grade equipment quietly fails. One ISO-form container delivers utility-class power, survives polar winters and high-altitude extremes, and remains sovereign under contested communications.

Where conventional mobile BESS protect availability, Tough Bhoy protects **availability and authenticity**. Hardware-grade quantum random number generation (QRNG) from Quantum eMotion sits at the controller layer, signing every command, telemetry packet, and firmware update with keys that cannot be predicted by an adversary's compute advantage.

The result: a redeployable, quiet, zero-emission power plant that slots into hybrid generator setups, microgrids, or true off-grid operations — with a cyber-physical security posture aligned to NATO IC26, FVEY, and allied critical-infrastructure mandates.

■ AT A GLANCE		TB-SPEC-001
■ SYSTEM TYPE	Mobile BESS · ISO 10 / 20-ft	
■ NAMEPLATE (10-FT)	520 kWh / 270 kW	
■ NAMEPLATE (20-FT)	1,040 kWh / 540 kW	
■ CELL CHEMISTRY	LFP (1P260S)	
■ OPERATING RANGE	-50 °C to +55 °C	
■ INGRESS	IP55 / IP67 sealed	
■ CYCLE LIFE	≥ 6,000 cycles	
■ CRYPTOGRAPHY	Hardware QRNG	
■ MOBILITY	Air · sea · road · rail	
■ COMPLIANCE	NATO IC26 · FVEY-aligned	
■ ORIGIN	■ ■ Canada-led, allied build	

01

Deploy

ISO 10-ft or 20-ft form, integrated lifting/lashing/skid points, sea-lift and air-lift ready.

02

Secure

QRNG-signed comms and SCADA — closes the entropy gap that breaks classical PRNGs.

03

Endure

Active heating, IP55/IP67 ingress, thermal management for true -50 °C operation.

PROVEN AT THE EDGE

Where commercial equipment quietly fails.

Mining sites, FOBs, and Arctic stations share one constant — an operating envelope that exposes every weakness in mass-market battery enclosures. Tough Bhoy is purpose-built for those envelopes from the chassis up.

■ FIELD-VALIDATED ENVELOPE

IEC · IP55 · IP67 · -50 °C

-50°C

COLD-SOAK VALIDATED

IP55

CONTAINER INGRESS

IP67

CABINET INGRESS

65 dB(A)

ACOUSTIC AT 1 M

02 · TECHNICAL SPECIFICATIONS

Hard numbers for hard places.

Tough Bhoy ships in two ISO form factors — a 10-ft container with 2 × 261 kWh units (520 kWh / 270 kW), and a 20-ft container with 4 × 261 kWh units (1,040 kWh / 540 kW). Multi-container microgrids scale linearly. Subject to change without notice.

ENERGY & POWER

Nameplate energy	520 / 1,040 kWh (10 / 20-ft)
Continuous power output	270 / 540 kW (10 / 20-ft)
Peak power (10 s)	300 / 600 kW (10 / 20-ft)
Round-trip efficiency	≥ 92 %
AC interface	3-phase, 480 V (60 Hz) · 400 V (50 Hz)
DC bus	800 – 1,000 V nominal

POWER CONVERSION (PCS)

Topology	Bidirectional, IGBT
Modes	Grid-forming · grid-following · island
Hybrid sources	Diesel, solar, wind, hydrogen
Black-start	Yes · 100 % black-start capable
THD	≤ 3 % at rated load

MECHANICAL & MOBILITY

Form factor	ISO 10-ft or 20-ft, sea-/air-/road-/rail-mobile
Curb weight (full)	7,200 kg (10-ft) · 16,000 kg (20-ft)
Footprint (L×W×H)	3.0 × 2.4 × 2.6 m (10-ft) · 6.1 × 2.4 × 2.6 m (20-ft)
Lifting	ISO corner castings · forklift pockets · skid frame
Mounting	50-ton transporter compatible

CELL & STACK

Chemistry	Lithium-Iron Phosphate (LFP)
Architecture	1P260S, modular rack
Cycle life	≥ 6,000 cycles to 80 % SOH
Calendar life	15 yr design
Depth of discharge	80 – 90 %
BMS	AI-augmented, cell-level isolation

THERMAL & ENCLOSURE

Operating temperature	-50 °C to +55 °C ambient
Conditioning	Liquid-cooled chiller + resistive heating
Container ingress	IP55
Battery cabinet ingress	IP67
Suppression	Multi-stage, off-gas detection
Acoustic emission	≤ 65 dB(A) at 1 m

CYBER & COMPLIANCE

Entropy source	Hardware QRNG (Quantum eMotion)
Key signing	Telemetry · SCADA · firmware · command
Standards alignment	NATO IC26 · FVEY · IEC 62443
Comms	Encrypted SCADA, optional EMI-aware mode
Sovereign-build	Canadian-led integration

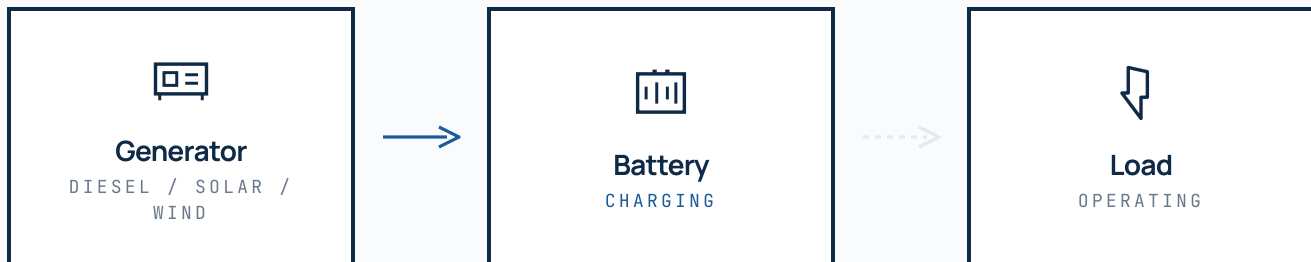
03 · OPERATING PRINCIPLE

How the hybrid setup works.

Tough Bhoy reduces generator runtime by up to 80 % in hybrid mode. The diesel set runs only to recharge — the battery powers the load quietly, cleanly, and with zero emissions until it depletes.

PHASE 01 · GENERATOR CHARGES BATTERY

The diesel generator (or a renewable source) supplies the load and directs surplus power to the BESS. The system continuously load-senses to optimise generator efficiency.



PHASE 02 · BATTERY POWERS THE SITE

When the BESS is fully charged, the generator switches off. The battery powers the load silently, with zero emissions. When depleted, the controller automatically restarts the generator to recharge.



80%

Generator runtime reduction
(hybrid mode)

60%

Fuel-burn reduction at typical
FOB load

0 g

CO₂ emissions during battery-
only operation

04 · MISSION USE CASES

Where Tough Bhoy operates.

Four primary deployment classes drive the platform's design envelope. Every Tough Bhoy unit is configured against one of these mission profiles before shipment — the dedicated military configuration is detailed on the following page.

01 DEFENCE · FOB

Forward operating bases

Silent watch, comms uptime, and a quiet primary power source for forward operating environments. Hybridises with deployed gensets to cut the convoy footprint that puts personnel at risk on contested supply lines.

GENSET RUNTIME CUT

80%

ACOUSTIC SIGNATURE

≤ 65 dB(A)

RESTART

Black-start

SILENT RUNTIME

HYBRID GENSET

EMI-AWARE OPTION

RAPID LIFT

02 ARCTIC · NORTHERN

Sovereign Arctic energy

Diesel offset and renewable firming for remote stations, ranger detachments, and Northern community microgrids. Validated to operate from -50 °C ambient with active battery heating and IP55/IP67 ingress.

VALIDATED COLD ENVELOPE

-50°C

SEA-LIFT

ISO certified

INDIGENOUS-LED

Malahat

-50 °C ENVELOPE

SEA-LIFT READY

INDIGENOUS-LED OPS

NATO IC26

03 MINING · RESOURCE

Off-grid critical-mineral sites

Critical-mineral mines, exploration camps, and EV haulage charging with rugged, mobile, redeployable energy infrastructure. Modular stack supports microgrids from a single 520 kWh (10-ft) or 1,040 kWh (20-ft) container up to multi-MWh installations.

PER CONTAINER · STACKABLE

520 / 1,040 kWh

MODULAR STACK

Multi-MWh

RE-DEPLOYABLE

Skid frame

DIESEL OFFSET

GENSET HYBRID

HEAVY-DUTY

RE-DEPLOYABLE

04 CRITICAL INFRASTRUCTURE

Hardened grid edge

Sovereign backup and demand-response for transmission edges, ports, datacentres, and emergency-services hubs where commercial-grade BESS lack the cyber-physical resilience needed under contested operations.

HARDWARE-SECURED COMMS

QRNG

COMPLIANCE

IEC 62443

TOPOLOGY

Grid-forming

BLACK-START

GRID-FORMING

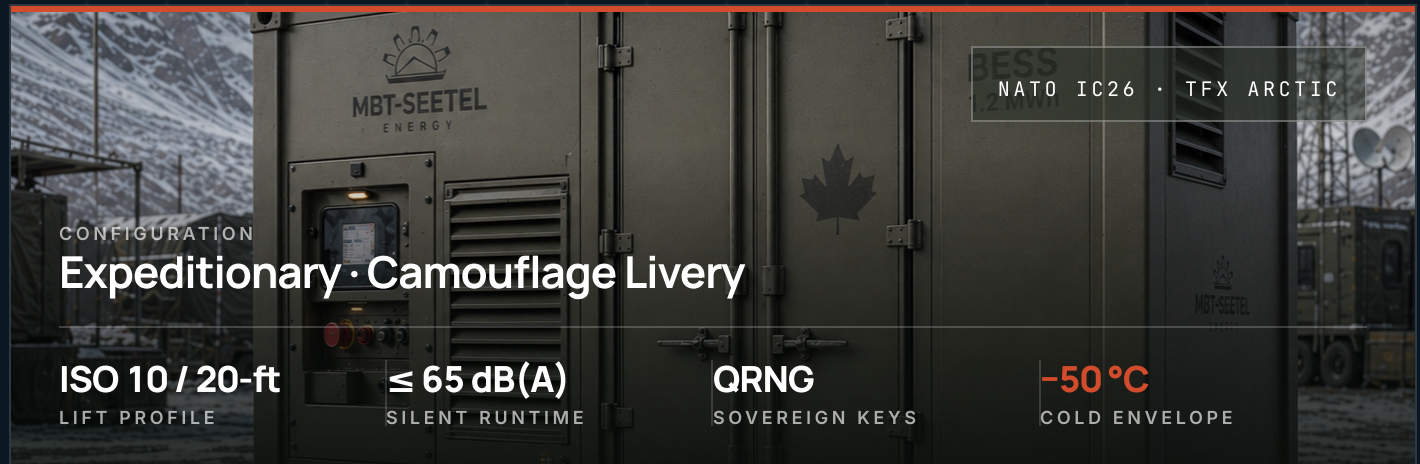
QRNG-SIGNED SCADA

IEC 62443

MILITARY APPLICATIONS · INSERT

■ RESTRICTED · NATO IC26 PATHWAY

Built for the force protection envelope.



Tough Bhoy is engineered against defence procurement criteria from the first weld — silent runtime, low thermal and acoustic signature, EMI-aware operation, sovereign cryptography, and the field-mobility profile of an ISO-form expeditionary asset.

01 ACOUSTIC / IR SIGNATURE

Silent watch

Battery-only operation removes the steady diesel acoustic and thermal signature that exposes forward operating positions to acoustic and IR sensors.

03 QRNG · IEC 62443

Sovereign cryptography

Hardware QRNG closes the predictable-PRNG entropy gap common to commercial BESS controllers — narrowing the attack surface that an adversary's compute advantage relies on.

05 LOGISTICS RESILIENCE

Convoy footprint reduction

Hybrid operation reduces fuel resupply convoys by up to 60 % — directly cutting the personnel exposure profile on contested supply routes.

02 EMC / SPECTRUM HYGIENE

EMI-aware mode

Selectable EMI profile minimises switching-noise emissions in the bands relevant to deployed comms and sensor packages.

04 FORCE PROJECTION

Air- and sea-lift profile

ISO corner castings, lifting points, and integrated skid frame match the lift profile of expeditionary force packages — including C-130 / CC-177.

06 NATO IC26 · FVEY

Allied-aligned build

Canadian-led, allied-supply build aligned to NATO IC26 and FVEY critical-infrastructure mandates. ITAR-aware integration paths available.

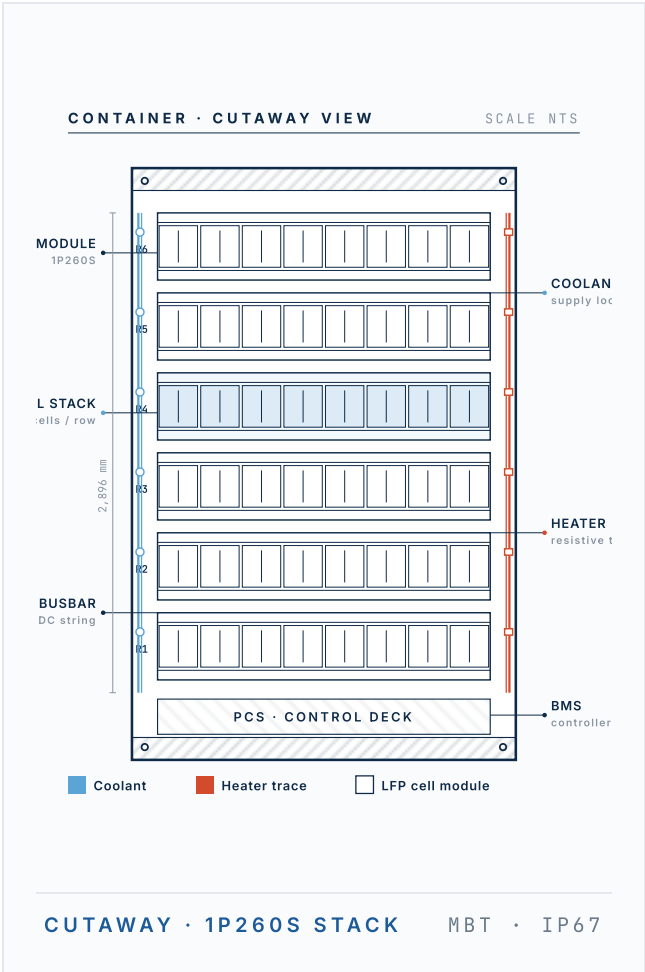
60% Fuel-resupply convoy reduction at typical FOB load

HYBRID GENSET · INDICATIVE · MODEL-DERIVED

05 · SYSTEM ARCHITECTURE

Inside the container.

Battery, power conversion, and thermal management are engineered as one platform — pre-commissioned, factory-tested, and shipped ready to energise.



01

LFP cell stack
BATTERY · BMS

1P260S architecture — 2 × 261 kWh units (520 kWh, 10-ft) or 4 × 261 kWh units (1,040 kWh, 20-ft). AI-augmented BMS with cell-level isolation.

Chemistry	LFP
Cycle life	≥ 6,000 cycles
Cell isolation	Per-string

02

Bidirectional PCS
POWER CONVERSION

270 kW (10-ft) or 540 kW (20-ft) continuous PCS with grid-forming and grid-following modes, paralleling diesel, solar, wind, or hydrogen sources.

Continuous	270 / 540 kW
Modes	Form / Follow
Interface	3-phase 480 V

03

Active conditioning
THERMAL · ENCLOSURE

Liquid-cooled chiller and resistive heating maintain the cell temperature window from -50 °C through +55 °C high-desert duty.

Range	-50 °C / +55 °C
Ingress	IP55 / IP67
Suppression	Multi-stage

CONTROLLER LAYER

Energy Management

LOAD-SENSE + DISPATCH

QRNG Crypto Core

QUANTUM EMOTION HW

Remote SCADA

ENCRYPTED TELEMETRY

06 · DEFENCE-GRADE SAFETY

Engineered for the harsh weather and abuse profiles of defence and remote operations.

Tough Bhoy uses Lithium-Iron-Phosphate (LFP) cells for thermal stability, long cycle life, and non-toxic material composition — paired with a layered safety stack designed for sites where commercial-grade equipment quietly fails.

DEFENCE-GRADE SAFETY STACK

01

Cell-level isolation

AI BMS isolates affected strings before thermal events propagate to neighbouring modules.

02

Multi-stage suppression

Off-gas detection triggers suppression sequence — venting, agent dispersal, and electrical isolation.

03

Hardened enclosure

IP55 container, IP67 cabinet, marine-grade welds and corrosion-treated panels for sea-lift duty.

04

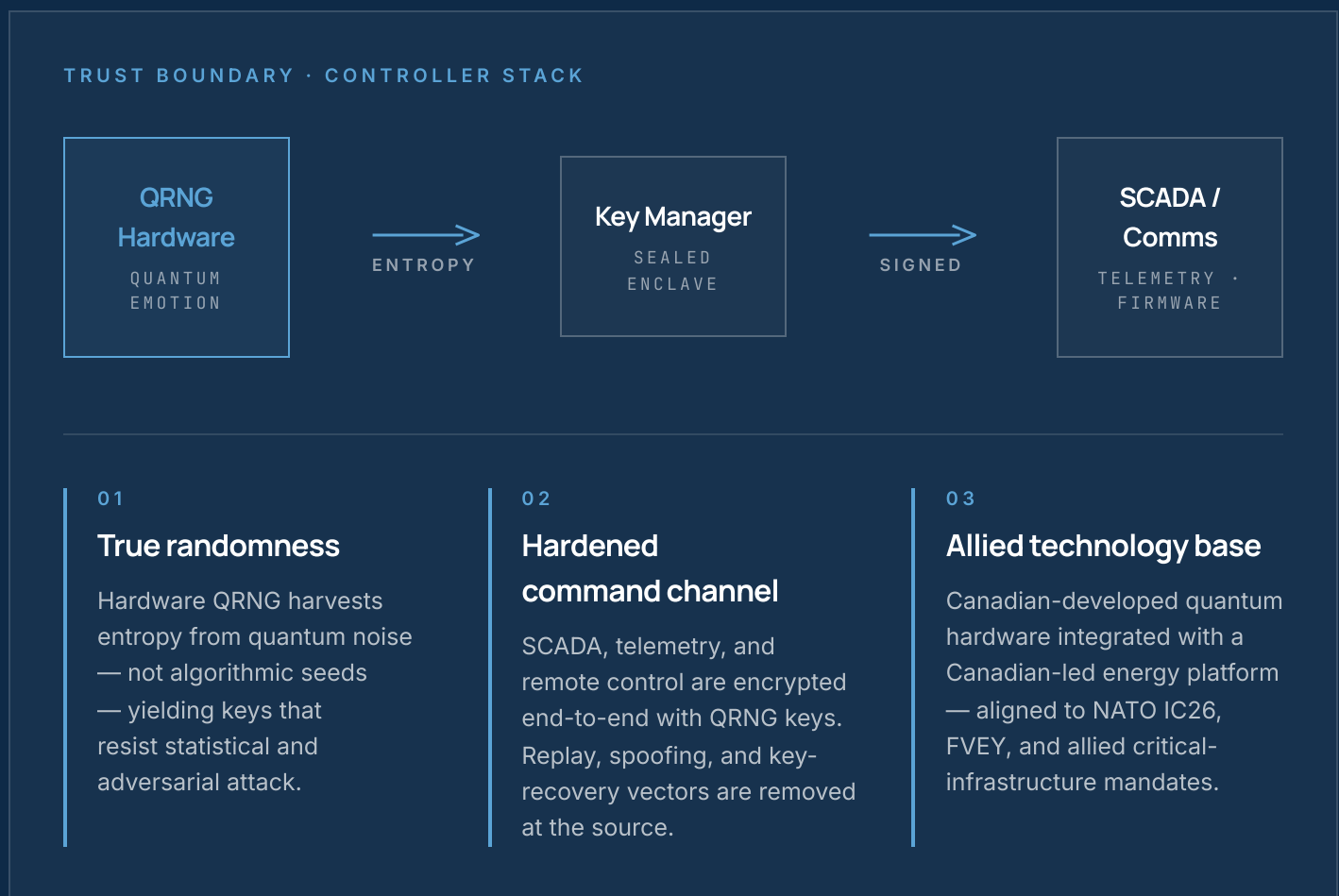
UL & NRTL pathway

UL 9540 / 9540A test pathway available for defence sites requiring stringent third-party safety listings.

07 · QUANTUM ARCHITECTURE

Energy you can trust. Keys you can't predict.

Tough Bhoy embeds true quantum random number generation at the controller layer. Every command, telemetry packet, and firmware update is signed with cryptographic keys sourced from physical quantum entropy — closing the predictability gap that breaks classical software PRNGs in defence environments.



ENTROPY SOURCE

Hardware

STANDARDS

IC26 · FVEY

KEY SIGNING

Per-packet

08 · ENERGY MANAGEMENT

Monitor and dispatch from anywhere – securely.

Sensitive defence and critical-infrastructure sites need both visibility and sovereignty over the energy layer. Tough Bhoy ships with an on-board Energy Management System (EMS) that pairs near-real-time monitoring with QRNG-encrypted remote control.

01

Remote Monitoring & Control

Monitor batteries, generators, and connected loads via a secure web platform. Adjust system settings, dispatch profiles, and alarm thresholds without on-site visits.

State of charge	Per-string, 1 Hz
Power output	kW · kVAR · kVA
Cell temperature	Per-module
Alarm latency	≤ 2 s

02

Secure Web Platform

QRNG-signed sessions, role-based access, audit-trail logging. Deployable on operator-owned infrastructure or in an air-gapped on-prem mode for sensitive sites.

Auth	Role-based · MFA
Session keys	QRNG-signed
Audit log	Immutable, append-only
Mode	Cloud / on-prem / air-gap

REAL-TIME VISIBILITY

STATE OF CHARGE

78 %

Per-string averaged

OUTPUT

156 kW

3-phase, balanced

CELL TEMPERATURE

22 °C

-4 °C ambient

GENSET

OFF

Standby · 14 h

24-HOUR DISPATCH PROFILE



■ BATTERY OUTPUT ■ GENERATOR OUTPUT ■ LOAD DEMAND

09 · MOBILITY & DEPLOYMENT

Air. Sea. Road. Rail.

Tough Bhoy ships in two standard ISO form factors — 10-ft (520 kWh / 7,200 kg, 2 × 261 kWh units) and 20-ft (1,040 kWh / 16,000 kg, 4 × 261 kWh units) — both with corner castings, forklift pockets, and integrated skid framing.



Air-lift

C-130 · CC-177
cargo bay



Sea-lift

ISO container slot, on-deck or RoRo



Road

Standard low-bed and 50-ton transporter



Rail

Flat-car compatible, lashed via corners

DEPLOYMENT TIMELINE

T+0 H

Arrive on site

Lift off the transporter, place on hard standing or skid frame.

T+1 H

Connect

Single 3-phase tail-cable to load. Optional genset paralleling cable.

T+2 H

Energise

Black-start sequence, BMS handshake, EMS sync, system online.

T+4 H

Dispatch

Begin hybrid or island-mode operation. Remote operator confirms.

CURB WEIGHT

7,200 / 16,000 kg

FOOTPRINT

3.0 / 6.1 × 2.4 m

FIELD-UP TIME

≤ 4 hours

10 · CONSORTIUM

Built by an allied consortium.

Tough Bhoy is delivered by an integrated consortium of defence, energy, manufacturing, and quantum-technology specialists — each owning a clearly defined slice of the value chain.



CSE: QESS

VANCOUVER, BC · CANADA

ROLE

System lead · defence integration

Vancouver-listed defence-energy integrator. Leads engineering, certification, and government delivery of the Tough Bhoy platform. Owns the relationship with end customers in defence and Northern critical infrastructure.



INDIGENOUS-LED

VANCOUVER ISLAND, BC

ROLE

Project leadership · Northern delivery

Indigenous-owned project sponsor. Owns Northern community relationships, site delivery, and long-term operations & maintenance. Anchors the platform's sovereign Canadian identity.



TWSE: 7740

NEW ENERGY · TAIWAN

ROLE

Manufacturing · cell integration

Listed Taiwanese energy storage manufacturer. Builds the LFP container and battery cabinet under joint engineering with the consortium. Provides manufacturing scale and allied supply-chain depth.



TSXV: QNC · OTCQB: QNCCF

MONTREAL, QC · CANADA

ROLE

Quantum entropy · cryptographic core

Canadian quantum technology company. Delivers the QRNG hardware and secure key infrastructure embedded inside the Tough Bhoy controller. Provides the entropy source that underpins the platform's sovereign cryptographic posture.

11 · ENGAGE THE CONSORTIUM

Quantum-secured. Arctic-proven. Mission-ready.

MBT-Seetel Energy and consortium partners are accepting defence, Northern, and critical-infrastructure briefings for Tough Bhoy deployments through 2026. Sovereign Canadian build, allied-aligned, NATO IC26 pathway.

CONSORTIUM LEAD

**AEGIS**

CRITICAL DEFENCE ENERGY

VANCOUVER, BC · CANADA

NORTHERN DELIVERY

**MALAHAT**

ENERGY SYSTEMS

VANCOUVER ISLAND, BC · CANADA

■ WORK WITH US ·

**MALAHAT**
ENERGY SYSTEMS

TB-SPEC-001 · REV A

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