IRON FLOW BATTERY MANUFACTURE PROJECT

Reliable, Cost Effective Energy

"Energy Storage is an enabling technology that can smooth and shift energy generation and demand profiles. Cost effective storage has the potential to significantly increase the take up of renewables."

- AUSTRALIAN RENEWABLE ENERGY AGENCY (ARENA)

Sword and Stone has spent the last 4 years researching and evaluating the technology to support long duration batteries for the Australian market.

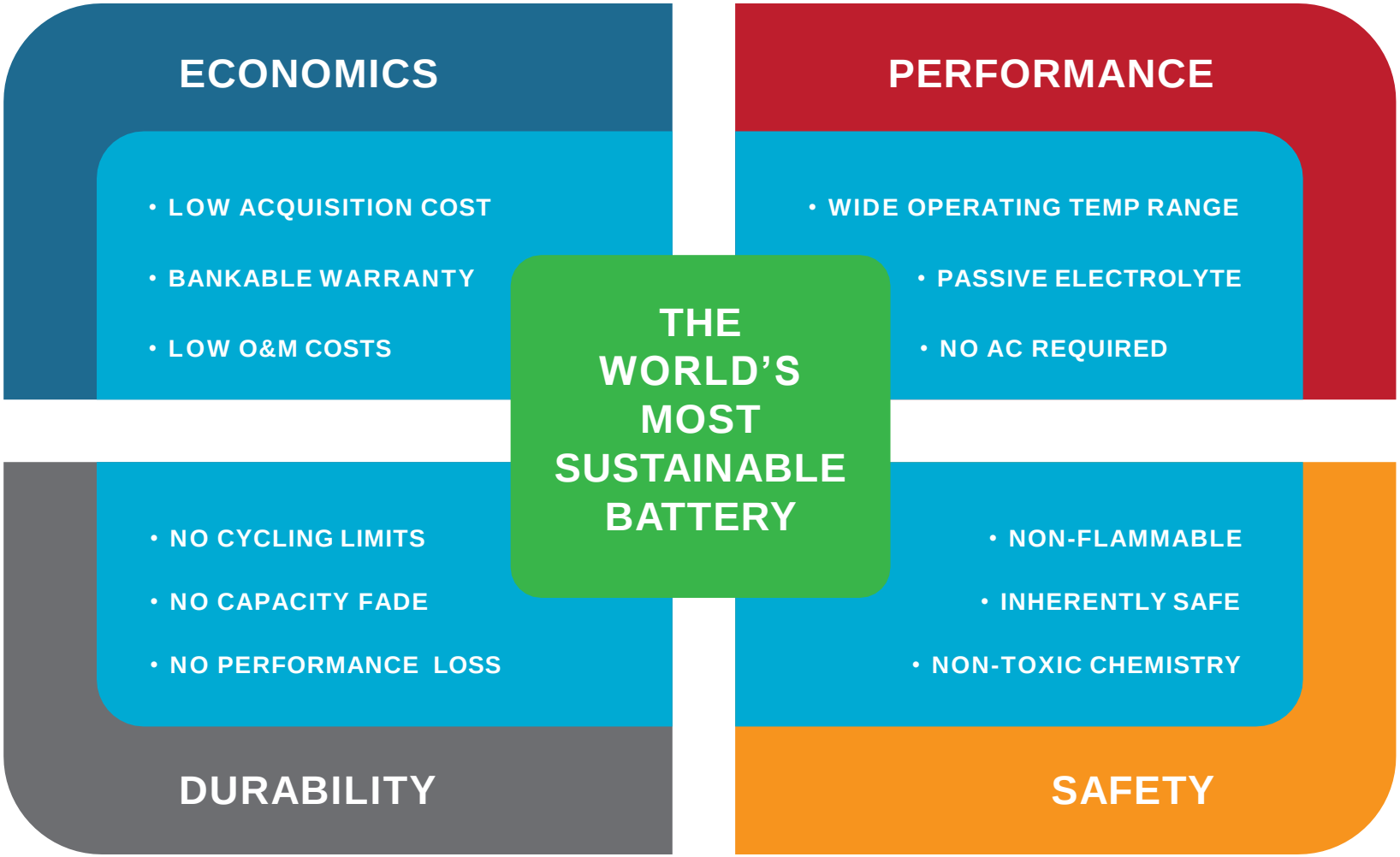
About Us

Sword and Stone Capital Management are a team focused on supporting the orderly transition to renewable energy.

- We have funding support from a LSE listed ESG Fund
- Experienced team from Tier 1 Gentailers and Multinational electrical components manufacturers
- Supported National O&M capacity
- Have worked with Arup over the past 2 years to identify the best storage technology that meets our requirement for:

    - Long duration 6+ hours
    - Low toxicity
    - Low cost
    - High reliability.

Value Proposition



A Safe, reliable and sustainable Battery System

IRON FLOW BATTERIES:

LONG DURATION, UNLIMITED CYCLING:

- Flexible revenue streams
- Supports grid by load shifting and dispatching over longer durations than competitors
- 25 - 40 year lifetime (more than double its competitors)
- Not subject to fire risk during operation
- Full recyclable
- Module design allows for 400KWh to 1GWh installation.

GRID SUPPORT:

- Provides flexible load shifting and ancillary support services to the grid
- Able to be installed in remote and inhospitable conditions.
- Operates better at higher temperatures (50c for the electrolyte is best)
- Can be stored charged for extended periods and not lose charge
- Can be cycled more than 1 time a day with no degradation.

ESS INC.

Battery technology being chosen is a USA (Portland) based company, producing an Iron-Flow battery:
ESS Inc: www.essinc.com.

The battery is either containerised, or in a warehouse. The entire system is non- hazardous and fully recyclable, including the electrolyte. Unlike other battery technologies this has no explosive risk and is suitable for close proximity to residential areas.

Higher temperatures (50c for the electrolyte is best)
- Can be stored charged for extended periods and not lose charge
- Can be cycled more than 1 time a day with no degradation.

Diverse and Experienced Investor Base

Flow Battery Inherent Advantages for Microgrids

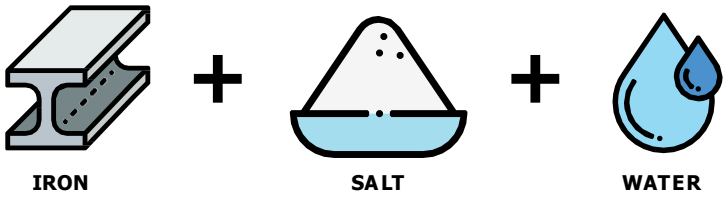
Low Cost, Abundant Electrolyte Materials
+ Can ship dry, just add water
+ Non-toxic, non-flammable

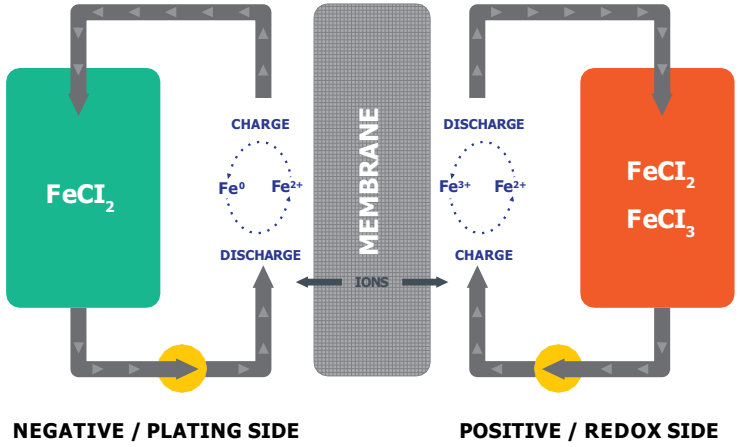
8-hours Nameplate Capacity, 25 Year Life
+ No capacity loss with cycles, or time
+ Flexibility for multiple uses

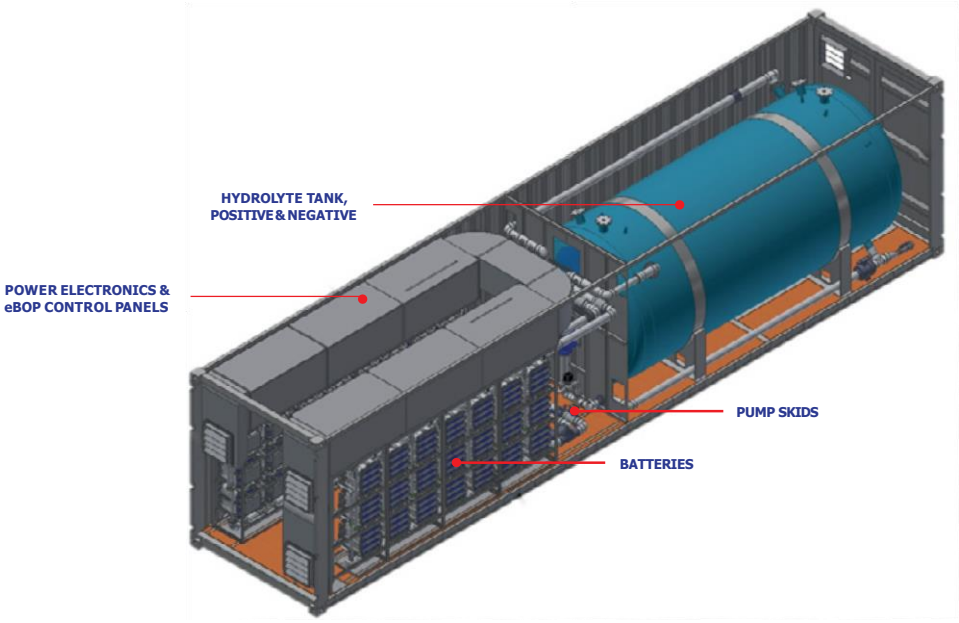
DC/DC Round Trip Efficiency ~75%

Fast Response Times for Grid Stability
+ Full power in <1 second

Lowest LCOS when Frequently Cycled







Iron Flow Battery Microgrid Projects

- Stone Edge Farm Microgrid Project - Sonoma, CA
- IFB for bulk shifting of PV to nighttime use

- US Army Corps System for FOB load following
- Automatically starts generator to re-charge, saving fuel

- IFB 50kW/400kWh system installed at wind test facility in west Texas
- Wind and solar shifting, DNV-GL testing multiple use cases

- IFB 50kW/400kWh system installed at Univ. of Calf. San Diego
- Testing is microgrid environment for multiple use cases

Forward Operating Base Microgrids - Reduce Fuel Requirements

Attributes of Energy Storage for the Military FOB Microgrid Applications

- Reduce use of generators, only operate at peak efficiency
- Expecting 20-30% fuel savings
- Combine with PV or wind and dramatically reduce generator use
    + With Iron Flow Battery, ship dry and add water at FOB
    + Saves 60% of shipping weight
    + Portable for redeployment
- Non-toxic, non-flammable for safety with troops
- Operates without air conditioning in hot environments
- Silent watch capability.

Remote Use Case Study

Location: Remote region of Southern California, at utility substation

Use Cases:
- provide resiliency to a small local community during Public Service Power Shutoffs (PSPS) events (primary use case)
- Daily shifting of solar to evening peak period (4-9PM)
- Utility to sell ancillary services to the grid operator.

Microgrid Systems:

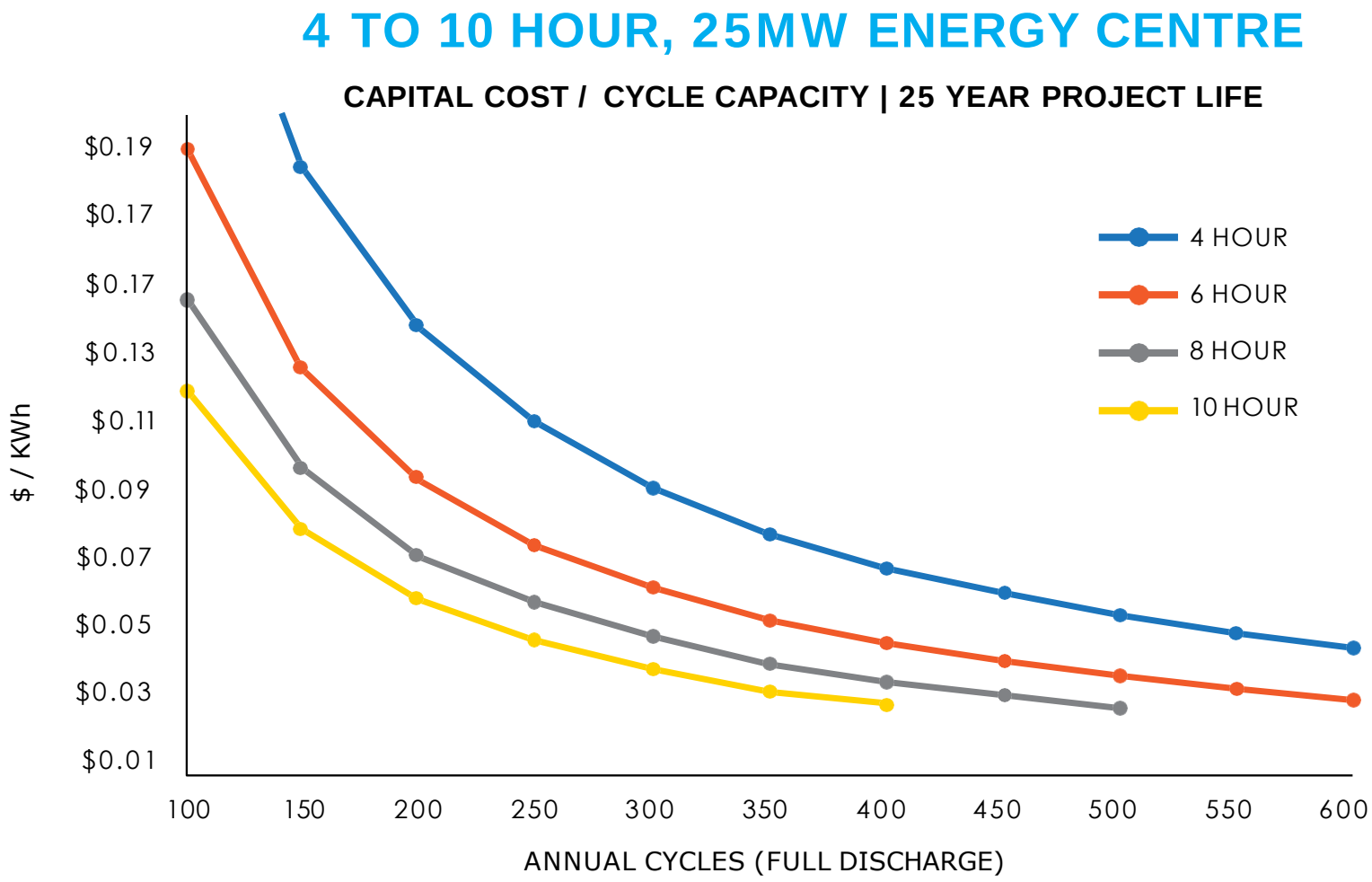
Energy Storage: Iron Flow Battery Energy Warehouse (6) “DC” systems totalling 540kW peak power and 3,000kWh total capacity.
ESS providing warranty backed by Munich RE
Solar: ~500kW of ground-mount PV
Full microgrid solution developed by ex Caterpillar Technicians
Backup diesel generator.

Operational Date: July 2021, prior to the start of wildfire season in Sept.

Energy Centre

- 3MW – 1 GW storage solutions
- Up to 16 hour duration
- 96% plant availability over 25 year operating lifetime
- Customisable to meet power and energy requirements
- No cooling/air conditioning requirement
- No power or energy degradation regardless of cycling duty
- Non-flammable, non-explosive, no hazardous materials
- Environmentally friendly, 100% recyclable
- Wide ranging capabilities make the EC suitable to support:
  - Large- scale renewable energy projects,
  - As well as transmission and distribution-level services,
  - Without cycling limits.

Reliable Low Cost Storage of Enery



The more you use it the cheaper the cost of energy. This battery likes to be cycled.


ESS INC
ASIA PACIFIC

ESS Asia Pacific

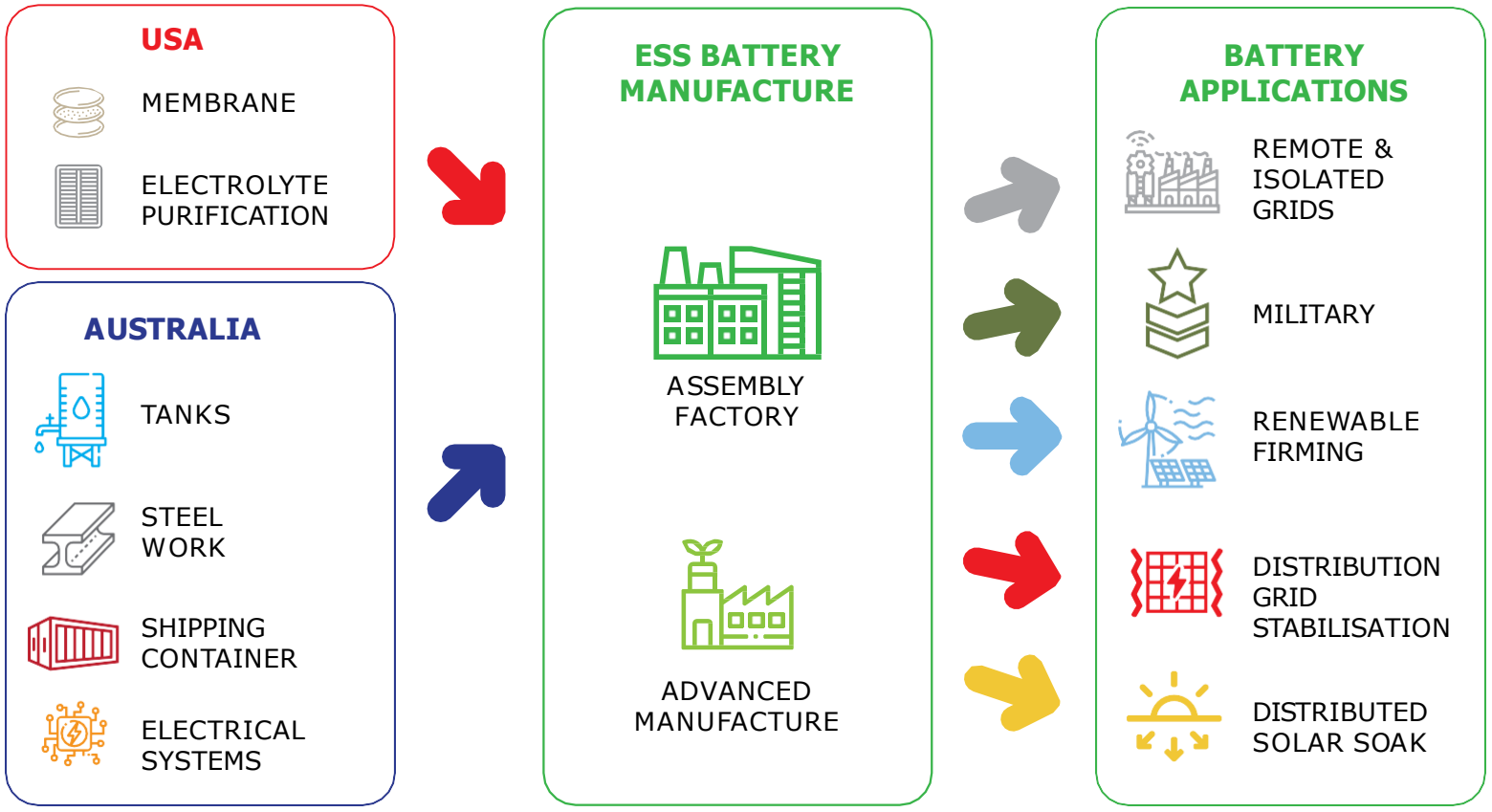
ESS,Inc and Sword and Stone are in the process of establishing a JV to manufacture, distribute and operate Iron Flow Batteries in the state.

We are in the advanced stages of evaluating the operating model tht will trigger sites in Maryborough and then Townsville.

We will manufacture to meet Australian, Pacific Nations and eventually SE Asian demand.

Queesland Government via State Development and TIQ, Fraser Coast Council and Townsville City Council have been integral in attracting this to the state.

A Local Procurement Strategy



Key Benefits to the State

Local Procurement at Full Capacity:

- 135 specialised tanks per month
- 135 pre-fabricated containers
- Piping, cabling and electric components
- 266 mid sized pumps per month.

Output from Facility:

- Initial build to 20MWh of storage per month delivered to install in the NEM by Q4 2022
- Aim to build production to 480 MWh per year by Q2 2024
- At full capacity it will provide 3% of storage required by 2040 per year.
- Will supply stable and relial future AEMO and State Government's REZ zone development.

Key Benefits to the State

Economic Support to the community:

- $320mn gross output per facility at full capacity in product delivered on a year on year basis by year 2
- $98mn per year in local procurement per facility spend by year 2
- Initial 125 FTE; building on approval of further additional shifts to over 250 FTE at full output
- Can support new and innovative generation projects with reliable storage.
- Skills link in with government renewable training initiatives
- Training apprentices to support assembly, installation and operational management of the batteries.

* Figures based on current operating conditions in US based facilities

Key Benefits to the State

Current State:

- We have met initially with suppliers
- conducting product localization and design changes to meet local requirements
- June/July local pilot plant
- Operation of the initial plant is expected to be from September 2022
- Due to the simple nature of the product with no rare earth minerals and mostly off the shelf components this is a relatively cost effective and fast process to set up manufacturing operations.
    - Looking further quantify demand across:
    - Remote grid locations
    - Behind the meter
    - Solar firming
    - Transmission support.

T H A N K Y O U

For more information, please contact info@swordandstone.com.au