2 CLEAN ENERGY

Clean Energy Solutions

PwrSwäp | Pay-as-you-go energy ecosystem

+Ports - The single largest source of pollution in a city

Port Expansion

Grid Stabilization

Vessels at Dock Zero Emission

Harbour Vessels – – Electric CTV's & Tugs

Port Machinery

Port decarbonization requires a sophisticated solution that can be rolled out across a whole host of assets, and that can integrate a variety of energy sources

Cold Ironing

+Energy Storage's Limitations Towards Decarbonization

As a fixed Asset, Energy Storage struggles on its own

- Size & Weight
- Range
- Capital Investment





+PwrSwäp

Energy-as-a-Service through Plugand-Play interchangeable batteries

- 1. Inland waterways ecosystems
- 2. Port electrification ecosystems -
- 3. Offshore wind ecosystems -
- 4. High speed/frequency ferry hub ecosystem

Sharing key attributes:

- Frequency allows for shared infrastructure to be economical
- Long-term contracts achievable
- Creates new markets for ESS not currently existing
- Ability to leverage ESS between marine and land-based applications

+Combining Infrastructure

Renewables & Utilities Are the Backbone

Next Generation Renewables are the next step



+Delivering Reliable Zero Emission Energy

- Small Vessels
- Cold Ironing
- Port Infrastructure
- Port machinery
- Large Vessels
- Last Mile Vehicles

All share common ESS form factors to deliver zero emission operations today





+Pay-as-yougo energy ecosystem

Combining Renewables with Energy Storage brings

- Cost Efficiency
- Enhanced Performance
- Zero emission operations

+Subscribe for PwrSwäp and then only pay \$/kWh of used energy

Changes the investment to an Opex business where we share the risk with you with guaranteed performance over life



+ePod Swapping

- Charge times no longer the limitation
- Improve Asset life without commercial compromise
- Pay for energy used



+Infrastructure

Renewables can now be applied to form the infrastructure of your facility

Buildings, Machinery and Equipment, Vehicles and Ships become the foundation for a zero emission system of operations



+Vessels On Standby

While on standby, a vessel's generator will run inefficiently for hotel load only, producing massive emissions.

It is not uncommon for some ports to have as many as 100+ vessels "waiting". This can amount to 3,000 tonnes of carbon per day emitted or emissions of 238,000 cars.

Solution - Electric ESS barges that can provide the vessel's port loas, as zeroemission, Even if the above only represents the top 10 ports of the world, that is the emissions of 2,38M cars. In Singapore, there are about 832,000 cars, so we are talking about 3x the emissions of all vehicles in Singapore saved.



+Port Eco System



+How it Looks Technically

Each PwrSwäp Station is a fully integrated charging system

Incorporating Renewable and Utility infrastructure

- Utilities
- Solar Panels
- Solar Roads, Walkways
- Fuel Reformers
- Fuel Cells /Storage
- Future Technologies

Delivering Future Proof Zero Emission in Ops performance



+Building Now - Port Applications

Vessel Specs:

Length overall: 18.50 metre Beam moulded: 8.00 metre Clear Deck Area: 60.0 m² Design Draught: 1.45 metre Operating Speed: 8 to 10 knot Sprint Speed: 12 knot Complement: up to 4 Crew + 8 passenger Max. Cargo Load: 20 mt No. of Battery: 6x ePods = 420 kWh Mode of Charging: Battery Swap + Plug in Charging (CCS2) Launching Late 2023

HVDROMOVER



Class Notation

RINA C & Hull • MACH, Workboat, NAV30, Battery Powered Ship

+Delivering Solutions

By combining all needed elements, we deliver the most viable solutions:

- Meet GHG Goals

-Deliver real financial value

-Improve reliability and reduce risk

Next Generation Renewables are the next step



+Profitable Zero Emission Operation

Case Study in Singapore:

- Twenty Vessels per station
- 360kWh of energy consumed per day per vessel
- 350 Days per year
- Charging Capacity of 3MW
- 14 hours per day, 2 trips per vessel per day
- Cost per day inclusive of Swapping ESS <u>\$13.84 SGD</u>
- Electricity per day (360kWh) @ \$0.23/kWh \$82.80 SGD
- Total cost/day of PwrSwäp Vessel
 \$96.64 SGD

Zero Emissions in Operations

+Profitable Zero Emission Operation

Case Study in Singapore:

- Average fuel per Vessel per day 800l
- Total fuel saved over 20 vessels 16,000
- Weight 16,000l of diesel
- Fuel saving in 350 operating days
 - 14800 mt CO₂
 - 406 mt NO_X
 - 13 mt CO

68% Less Operational Cost

13,309kg

4,658 mt

At \$5.00 SGD per ton CO₂, Save \$74,000 per year in Carbon Credits

+Profitable Zero Emission Operation - Canada

TRADITIONAL ONBOARD SYSTEM	CARTRIDGE BATTERY	
size 11MWh + Infrastructure		SIZE 2.8MWh
24 ton 24		WEIGHT 3 ton 24 Cost \$28 USD/trip operating cost
CLASS APPROVED Ves Ves TIME TO CHARGE 20-30		CLASS APPROVED Ves Yes TIME TO SWAP 3:00



+A practical solution that empowers customers to SHIFT 2 Clean Energy

Removes the risk & uncertainty of new technology and energy options

Removes high CAPEX required for electrification

Meets climate action goals today while providing ROI for the customer



