Product Presentation

Applicant Name: Ampd Energy

Product Name: Enertainer

Specification: https://bit.ly/3mOHATl

Core Functions:

- Provision of electricity for construction equipment
- Monitor As an IoT enabled device

Technology Used:

- Lithium-ion battery energy storage system

Construction Process involved:

- Power amplification for major construction equipment

Key Improvement in Construction Process:

- Productivity
- Safety
- Improve health and safety of construction site working environment
- Significant air pollution, carbon emission and noise pollution reduction

Job Reference:

- Advanced Manufacturing Centre
  - Client: Science Park
  - Contractor: Gammon Construction
  - Application: Tower crane, 24hr, semi-indoor
- Murray Road 2
  - Client: Henderson Land
  - Contractor: Hip Hing Construction
  - Application: 64 ton tower crane
- Multi-welfare Services Complex
  - Client: Architectural Services Department
  - Contractor: Shui On
  - Application: MiC, tower crane, hybrid recharge
- Lama HKE Gas & Steam Turbine Power Station Extension
  - Client: HKE
  - Contractor: Paul Y
  - Application: Tower crane

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Innovative Features

- Core Technology:
  - Lithium-ion energy storage system
  - IoT connect device for remote monitoring and data analytics
- Patents:
  - Top level electrical architecture of the Enertainer
  - ‘Enercore’, single battery module used in Enertainer
- Comparison with current practice and popular models:
  - Old technology: Genset (combination of diesel generator and electric generator)
  - Specification:
  - Benefits, compared to gensets:
    - Reduces carbon footprint by up to 85%
    - 32x quieter
    - Emits zero diesel fumes
    - Eliminates diesel handling and usage risks
    - Economically justified for operation cost savings
- First Launch Date: October 25th 2019

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Adoption Example

- Project for Illustration:
  - Multi-welfare Services Complex, Kwu Tung North development area
  - Client: Architectural Services Department
  - Contractor: Shui On
  - First delivery date: 16 Oct 2020
- Work Process:
  - Enertainer powering heavy tower crane to support Modular Integrated Construction (MiC)
- Use/Function in project:
  - 4 Enertainers powering 4 tower crane
  - Hybrid recharge of Enertainers

Enertainer powering a tower cane lifting a heavy MiC module

Benefits – Productivity

- Improve productivity by:
  - Completely eliminating maintenance and refueling downtime (Gensets are mechanically complex and break down frequently. They are also reliant on diesel fuel)
  - Designed as a plug-n-play system that can be installed and ready for operation in under 2 hours
  - Providing 24/7 remote monitoring of construction site equipment through IoT enabled data platform, the “Enernet”
- Real world example:

  Using Ampd Energy’s data platform, “Enernet”, users can remotely monitor the real time status of the Enertainer. When the input charging of the Enertainer stopped, a warning showed up on the Enernet. Upon further investigation it was diagnosed that electricity input from the grid had actually tripped so the Enertainer did not charge up. The site electrician quickly fixed the grid input and the Enertainer resumed charging again. The root problem was diagnosed all within minutes, the operation was not interrupted at all.

  In comparison, traditional diesel generator do not have the ability to connect to the internet for remote monitoring. The workers need to physically walk all the way to the generator to see the status of the generator, increasing the difficulty of management especially in a large construction site. Besides, the meters on the generator are also inaccurate, the workers can only know the status of the generator when it breaks down. This interrupts the operation of site equipment and slows down the project schedule.

  With the Enernet, the issue was immediately alerted and root problem diagnosed within minutes, drastically improving site productivity and inefficiency.

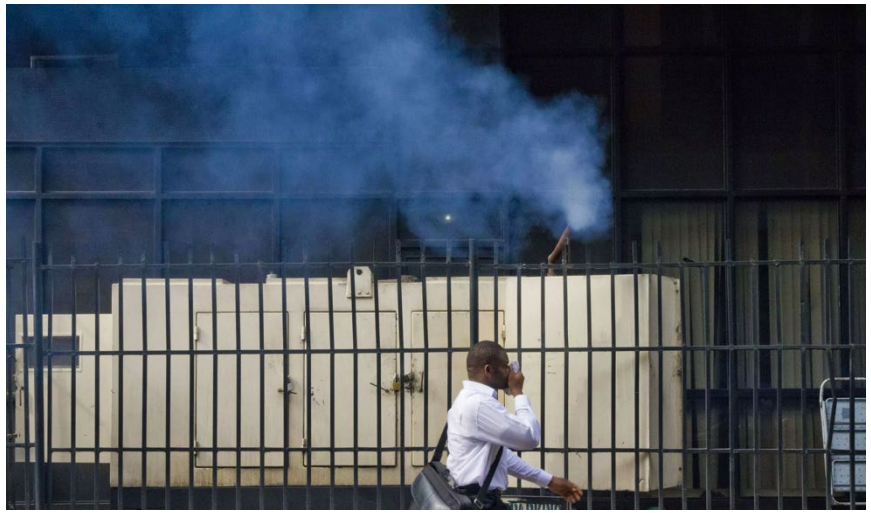
Enertainer busbar is designed very similarly to genset’s busbar, allowing easy and efficient adoption

Benefits – Safety

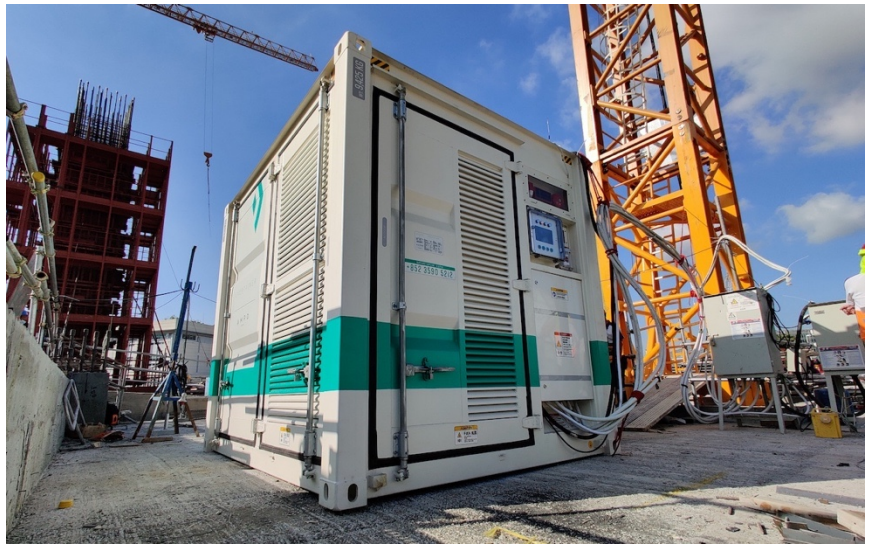
- Improve safety by:
  - Completely eliminating diesel handling and usage risks
- The entire Enertainer is designed with safety as a top priority. Safety features include (but are not limited to):
  - Double-walled with embedded fire protection boards (防火板)
  - ELCB protected output
  - Explosion resistant Ampd Enercore battery modules
  - Flood sensors (6 total sensors)
  - Fire detection and suppression system
  - Multiple earthing points
  - Individual cell level CID built into the cells
  - Individual cell fuses on PCBA
  - BMS to measure cell parameters (voltage levels, charging/discharging currents, temps, over current/short circuit protection)
  - Fire retardant cell holder
  - Structural steel battery module holder with anti-vibration mounts
  - Dual redundant air conditioning system with large cooling safety factor
  - MCCBs for further short circuit protection

Benefits – Environmental

- Compared to diesel generators, the Enertainer:
  - reduces carbon footprint by up to 85% (even accounting for the carbon emissions of electricity generation used to charge the Enertainer);
  - is 32x quieter;
  - emits zero diesel fumes Zero NO_X, PM, SO_2
- Zero carbon, pollutant and noise emissions means a safer and healthier working environment for construction site workers
- The Enertainer automatically optimizes power usage during equipment idling, eliminating the wasteful continuous fuel consumption and pollution production by diesel generators.



Traditional method: polluting diesel generators



New method: Enertainer, clean battery energy storage system

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